

## SPECIFIC ISSUES OF CONSERVATION AND RESTORATION OF LIBYA MOSQUES (7TH CENTURY - 1815)

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### **Abstract**

*The article traces the genesis of the simple Arabic hypostyle mosque to the centrally-planned mosque of the Ottoman type. It is argued that the architectural development of plan types and volume-compositional characteristics did not depend on political processes and several rulers, but rather on those changes that took place in the traditions of the Islamic school of architecture. Three main periods of mosque architecture with sub-periods are defined: the early period of the introduction of Islam (641–749), the middle period (750–1550), and the late period (1551–1911). Each of the periods was characterized by noticeable changes in planning, design, structural schemes, and decoration.*

**Keywords:** Mosques of Libya; Preservation; Restoration; Problems of state conservation

### **Introduction**

One of the features of the Islamic school of architecture in Libya, which was formed from the Islamic conquests in the 7th century until 1911, is the presence of many different temporal and cultural layers. This determined its multiculturalism from one period to another, as each period had its character. The situation in different parts of Libya was not the same. The remote areas were mostly protected from external influences and managed to preserve their architecture and culture. On the other hand, the regions with more favourable natural climatic conditions, especially those on or near the Mediterranean coast, always attracted conquerors from other countries and experienced many external influences, both from the cultures of colonizing countries and neighboring countries such as Egypt, Tunisia, and Algeria.

The Islamic architectural heritage of Libya is not as well-known as the heritage of other Islamic countries. This is due to the numerous wars throughout Libya's Islamic history, as well as many contemporary problems. The first of these problems is political instability. Since the overthrow of Muammar Gaddafi in 2011, Libya has experienced constant political instability, armed conflicts, and changes in alliances. The lack of a stable government and security concerns hamper efforts to prioritize cultural preservation, including the protection of Islamic architectural heritage.

The second problem arising from the first one is the destruction and damage to objects caused by armed conflicts. Historical objects, including mosques, mausoleums, and other

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Islamic structures, become targets of attacks, acts of vandalism, or destruction. This destruction is often a result of military action, looting, or intentional acts of cultural destruction.

The third problem, which is also caused by the first, is the lack of funding and resources for the restoration and preservation of damaged cultural heritage sites. The conservation and restoration of architectural heritage require significant financial resources, qualified personnel, and technical expertise. However, the current economic problems in Libya, including reduced oil revenues and limited state funding, have seriously affected efforts to allocate sufficient resources to preserve the heritage.

The fourth problem is the insufficiently developed activities of heritage conservation institutions. The government bodies responsible for the preservation and restoration of cultural heritage sites lack trained professionals and material resources to carry out such activities. There is a shortage of heritage conservation experts, museum professionals, archaeologists, and restorers. Moreover, it is difficult to ensure the effectiveness of the legislative framework, which is sometimes violated in practice.

Insufficient activity by heritage institutions leads to illegal excavations and theft of artifacts, which are often smuggled out of the country and sold on the black market, resulting in further loss of cultural heritage.

The sixth problem is related to the violation of communication "state-monument preservation institutions-population". The presence of illegal excavations is due to the lack of public awareness of the value of Islamic architectural heritage and its importance for national identity and tourism in Libya.

The seventh problem is typical for most countries because it is associated with an increase in temperature, sharp deterioration of the environment, desertification, and sandstorms. These natural factors accelerate the destruction of historical structures and influence their long-term preservation.

An adequate response to all these challenges requires a comprehensive approach that includes stabilizing the political situation, increasing funding for heritage conservation, strengthening institutional capacity, strengthening security measures, promoting public awareness and education, and developing sustainable conservation strategies that take into account the impact of climate change. International cooperation, including support from UNESCO and other cultural preservation organizations, can also play a critical role in helping Libya's efforts to protect its Islamic architectural heritage.

Due to the lesser exposure of Islamic architectural heritage in the world compared to Islamic heritage in other countries, sources dedicated to general issues of preserving historical environments, historical objects, object-environment interaction, as well as issues of preserving historical heritage that suffered from war were used.

The object of the study is the mosques of Libya, the subject of the study is the specific problems of their preservation and restoration.

The purpose of the study was to argue for the importance of Libya's Islamic architectural heritage not only in a regional but also in a global context, to identify the characteristic features of Libya's historic mosques, the problems of their preservation, and directions for their solution.

To achieve the goal, the following tasks were set:

- identify the main problems related to the protection and restoration of historical mosques in Libya and their causes;
- identify the role of external factors in shaping the regional Islamic architectural school in Libya;
- characterize the main types of mosques and compare them with the types of mosques in other Islamic countries;
- describe the state of monument protection activities at the state level;
- formulate proposals to solve existing problems and provide recommendations for the construction of new mosques in Libya, taking into account regional traditions.

The source database was developed in the following directions:

1) problems of degradation of the historical environment, museumization of monuments, preservation of architectural heritage – articles by *V. Petrušonis* [1], *L. Pujia* [2], *P. Spiridon and I. Sandu* [3], *P. Spiridon et al.* [4];

2) the experience of studying mosques of countries whose traditions influenced the Islamic architecture of Libya – articles by *Y. Ivashko and K. Rezga* [5, 6], *Y. Ivashko and A. Dmytrenko* [7], *Y. Ivashko* [8];

3) analysis of the role of natural and climatic conditions in the perception of an architectural object in the environment – articles by *Y. Ivashko et al.* [9];

4) restoration experience – articles by *J. Abbasi et al.* [10], *P. Alfieri Paula et al.* [11], *M. Austigard and J. Mattsson* [12], *G. Chidichimo et al.* [13], *G. Frunzio and L. Di Gennaro* [14], *P. Gryglewski et al.* [15], *J.V. Oliver-Villanueva et al.* [16], *M. Orlenko et al.* [17], *M. Orlenko et al.* [18], *M. Orlenko and Y. Ivashko* [19];

5) problems of vocational education – articles by *D. Kuśnierz-Krupa et al.* [20], *O. Fomenko et al.* [21], *R.T. Holubchak et al.* [22].

## Materials and methods

The selection of scientific methods for solving a particular problem was determined by the research objectives. Photographic and graphic-analytical methods were used as the basis for theoretical research and the development of practical recommendations for the preservation of historic mosques and the construction of new ones. The method of historical analysis was chosen to study the influence of external factors (natural and climatic conditions, political, economic, and religious factors) on the formation of the Libyan Islamic architectural school. The methods of ethnographic analysis and cultural analysis were used to analyze the specifics of different types of mosques in Libya from the perspective of the ethnic composition of the population and the presence of foreign resettlements with certain cultural preferences. The comparative analysis method was used to identify similarities and differences between the Islamic architectural schools of Libya and those of other countries, and as a result, to determine the main types of mosques in Libya.

The research methodology was determined following the specifics of the research topic and its subject. The structure of the research and the chosen research methodology are based on the creation of a comprehensive database for the implementation of measures for the protection and restoration of monuments, as well as for the design and implementation of modern mosques with national forms and cultural and artistic background based on local traditions.

## Results and discussion

### *Islamic architectural school of Libya: the role of external factors*

Islamic architectural school of Libya was influenced by external forces, resulting in multiculturalism as its primary characteristic. The only exceptions are desert regions that are protected from external influences.

Further in the article, we will focus on three main periods of the establishment and development of Islam in Libya. However, other periods of the country's historical development have also influenced the formation of multiculturalism. For instance, it is worth mentioning the ancient period of settlement along the Mediterranean coast of Libya by Berber tribes (from 8,000 BCE). During this period, the unity of Libyan cultural traditions with other Maghreb countries was established.

In the architecture of Libya and the coastal areas of Tunisia and Algeria, the influence of ancient Roman and Greek traditions is noticeable. As an example, the ruins of the Roman city

of Leptis Magna, a Greek city on the Mediterranean coast, and the Arch of Marcus Aurelius in Tripoli are worth mentioning.

The periods of adoption and spread of Islam also had a significant impact on the country's multiculturalism, as foreign states introduced their own architectural and building traditions. Although in the early period, the cultural traditions of Libya were influenced by Persia, the influences of the Arab Caliphate and Ottoman Empire were much more significant, since the type of hypostyle mosque was borrowed from the Arabs, and the type of centrally-planned mosque with a large dome and distinctive minaret was borrowed from the Ottomans.

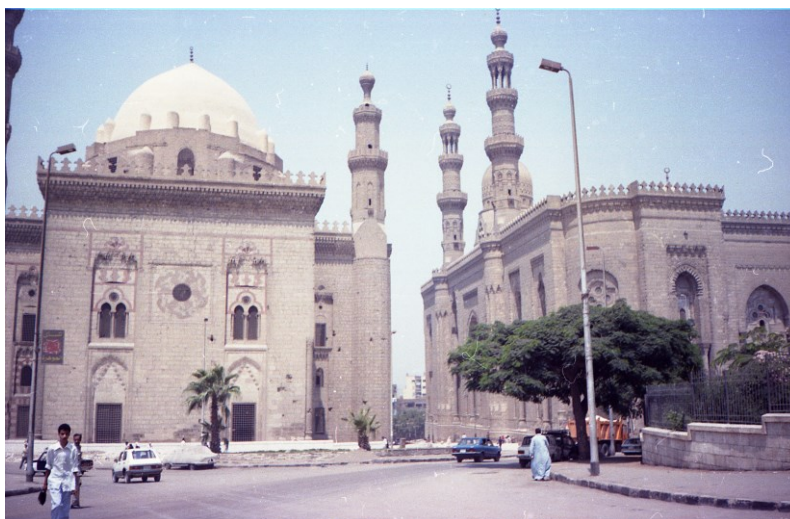
However, at the same time, there were also influences from Maghreb Berber dynasties, which led to the spread of mosques of the so-called Maghreb type. Even after the Arabs had displaced Berber tribes from the territory of Libya in 647 AD, certain Maghreb traditions remained, which explains the similarity of certain types of mosques in Libya, Tunisia, and Algeria. Tunisian and Algerian architectural styles have influenced Libyan mosques in various ways, from the use of horseshoe-shaped arches and complex-shaped ceramic tile cladding to the inclusion of inner courtyards and fountains.

One of the most significant influences on mosque architecture in Libya was that of neighboring Egypt. (Figs. 1 and 2). Egyptian architectural styles had a profound impact on the design of mosques in Libya, especially during the Ottoman period when Egypt was part of the Ottoman Empire. Many mosques in Libya have elements of traditional Egyptian Islamic architecture, such as domes and minarets.

Few mosques remain from the period of Arab dynasties, but most of Libya's surviving mosques date from the Ottoman period.

Italian colonization of Libya and current military actions have negatively impacted the preservation of Islamic heritage. Many mosques have been destroyed or damaged, and some mosques in areas of conflict are inaccessible for study and examination.

In modern times, historical mosques are negatively affected by busy transportation networks and the active re-planning of historically established city structures. This often leads to the demolition of historical monuments for the sake of constructing new highways or buildings.



**Fig. 1.** Mosque-Madrasa of Sultan Hassan (1356), Cairo.



Fig. 2. Sultan al-Muayyad Mosque (1415 – 1421), Cairo.

The lack of activity by preservation institutions also has a negative impact and can result in the distortion of architectural monuments due to unsuccessful additions (such as the case with the Asiraja al-Hamra Museum-Palace, residential and public buildings in the old city of Tripoli).

In Libya, the majority of the territory is located in desert zones, which logically explains the concentration of mosques in cities along the Mediterranean coast.

The chronological limits of the study are from 641 AD (the beginning of Arab rule) to 1815 AD (the end of Ottoman rule).

#### *Characteristics of Libyan mosques of various periods*

During the Islamic period in Libya, despite the diversity of architectural styles, there were four main types of mosques: Arab, Maghreb, Ottoman, and regional.

Compared to the monuments of later periods, the mosques of the Arab period have mainly survived in the form of ruins. The period of the Arab Fatimid dynasty is associated with several mosques, including the Sahnoon Mosque (934-946), which is a traditional Arab hypostyle type with a rectangular plan, an inner courtyard, a flat roof with small domes, and a minaret. Other examples include the Al-Naqa Mosque in Tripoli (10th –11th century), the ruins of a traditional Arabic hypostyle mosque in Ajdabiya (10th century), the ruins of a hypostyle mosque in Umm Al-Barakeem, the ruins of the Sultan Mosque (10th century) in Sirte, and the ruins of the Al-Barouni Mosque in the Nafusa Mountains in western Libya. In addition to the ruins of mosques, there are also individual examples of defensive fortifications and towers from the time of the Fatimids.

During the early period, there was a partial combination of the Arab hypostyle mosque tradition and the Maghreb mosque. This occurred during the reign of the Berber dynasty from Morocco, the Almohads, who, in the 12th century, captured Tripoli and rebuilt the Al-Naqa mosque. The Maghreb Islamic traditions of the Almohads provided for the inheritance of the type of an Arabic hypostyle mosque with perpendicular naves facing the qibla, square or cross-shaped (in the section) columns on which the arches rest, pointed and intersecting arches, using interior elements related to the architecture of the Cordovan caliphate, such as corner arches and specific decor, contrasting the undecorated space of the prayer hall and the decorated mihrab, and the presence of false niches.

Further in this article, we will focus on the three types of mosques that have survived to this day, since in their pure form the Arabic type of mosques of Libya have survived much less due to numerous wars, the Al-Naqa mosque was completely rebuilt in 1610 during the Ottoman rule, most of the mosques survived in the form of ruins.

The Maghrebi-style mosque also experienced influences of Ottoman architecture and could include fragments of ancient ruins, which were typical of the Mediterranean territories of Tunisia and Algeria. The Maghrebi character of the mosque could also be achieved by inviting Maghrebi builders to participate in its construction. Examples of such mosques are Al-Naqa mosque and Tajoura (Murad Agha Mosque).

The majority of preserved mosques in Libya belong to the Ottoman style (1531 – 1815). This style has two variations: a simpler one in terms of form and decoration, and a highly decorated one. If we were to describe these two variations, it's worth noting that the first variation represents the beginning and middle of the Ottoman rule in Libya, and the second variation represents the final stage. This deviation from a simple functional form to an overly decorated one is typical of the genesis of most styles. A style emerges as simple and functional, gets refined over time, and then declines due to oversaturation with decoration and is replaced by another style. In addition, the early Ottoman mosques in Libya also exhibit Maghrebi traits, which were explained by the practice of inviting Maghrebi masters as building experts in the local natural and climatic conditions.

The Ottoman period includes the mosques of Amr ibn Al-Aas, Abu Galaz in Benghazi in the Cyrenaica region, the mosques of Muhammad Pasha Shayeb al-Ain, Qaramanli, Mahmoud Mosque, Sidi Darghut Mosque, Sidi Salem Mosque, Gurgi Mosque in Tripoli, etc. (Fig. 3).

The next type of mosque is the so-called regional type in the desert climate. This is the most original and interesting example of the formation of an authentic type of mosque without the influence of other cultural traditions. A similar phenomenon is the mosques of Kharijite cities in the valley of the Mzab River in Algeria. An example of a regional mosque in Libya is the Atiq Mosque in Awija.

### ***Problems of protection and restoration of the historical mosques of Libya***

Since the Islamic architecture of Libya remains little known in the world, the war continues in the country and part of the mosques are inaccessible for study and preservation, many mosques have been destroyed, and the issue of protecting and restoring mosques is a priority task of the state.

As previously mentioned, the Islamic heritage of Libya has been negatively affected by numerous wars, years of Italian colonization, an ongoing civil war, as well as uncontrolled urbanization processes in cities. The problem of uncontrolled invasion of modern transport networks and construction in the established historical fabric of the city is also characteristic of other cities in the Maghreb countries, where the historical structure of the city consisted of a network of winding streets and cramped quarters. Attempts to implement modern planning lay out a highway network, and give orderly character to the construction fundamentally change the original appearance of the historical environment with old mosques.

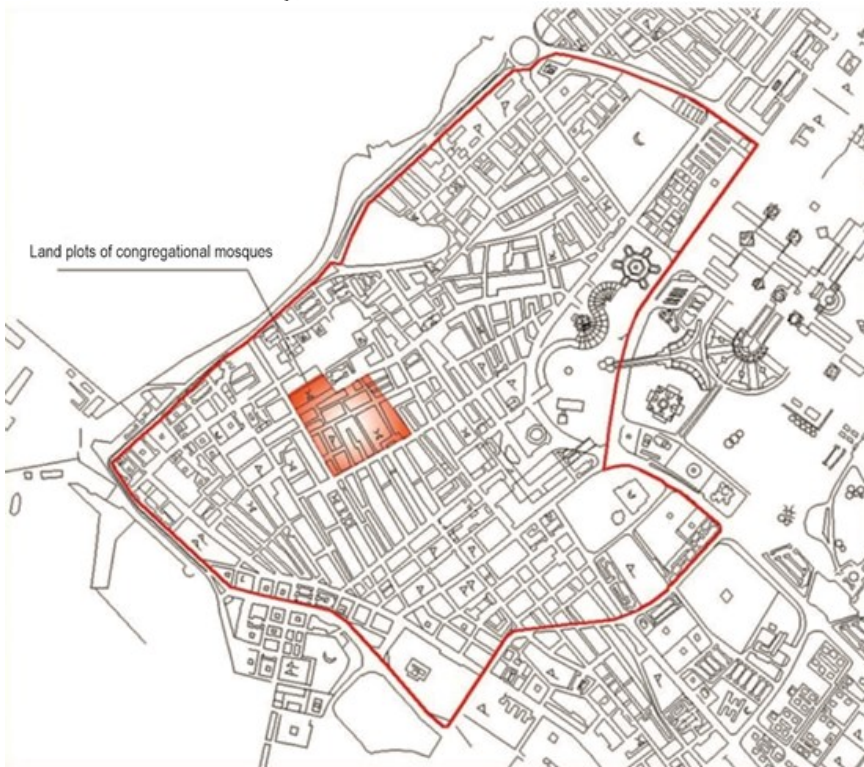
Libya went through several periods of rule, some of which had a positive impact on Islamic architectural heritage, such as the Fatimid period between 973 to 1145 and the Ottoman rule from 1551 to 1912, as mosque architecture reached its peak during this period. During this period, many outstanding Ottoman mosques were built that still exist to this day. Italian colonialism between 1911 and 1934 had a negative impact, with a policy of systematic destruction of Islamic cultural heritage and the lack of measures to restore historic mosques that were destroyed during the First and Second World Wars.



Contemporary urban planning situation

Fragment of the street network and location of mosques

- Al Atiq Mosque
- Usman Mosque
- Ubi Bin Kaab Mosque
- Bin Kato Mosque
- Tuffah Mosque
- Abdullah Bin Omar Mosque
- Al-Mushtari Mosque
- Khadija Mosque
- Al-Mundir Bin Amru Mosque
- Al-Madaniyya Mosque
- Said Bin Al-Musayyab Mosque



Plan of modern aerial photography

Fig. 3. Analysis of urban development around the historical mosques of Benghazi

In the period of Libya's independence during King Idris Al-Senussi's reign, some archaeological sites were cared for and restored. Additionally, some mosques that were dismantled during Gaddafi's regime were reconstructed.

During Gaddafi's rule in Libya, several historic mosques were indeed demolished or significantly altered without due regard for their historical and cultural value. Muammar Gaddafi followed an ideology that sought to erase elements of Libya's pre-Islamic and Islamic history, including historic mosques. One of the most notable examples was the demolition of the Sheikh Abdul-Salam Al-Asmar Mosque in Tripoli in 1978, a mosque that dates back to the 10th century.

In addition, the Gaddafi regime implemented urban development projects that often did not take into account the preservation of historic sites, particularly mosques. The main focus was on the modernization and construction of new infrastructure and buildings. This approach has led to the destruction or alteration of many historic mosques and other heritage sites.

Deleting these historical mosques without considering their cultural and historical value was the result of Gaddafi's desire to change Libya's identity and erase elements of its past.

A significant number of historic Libyan mosques are monuments of world, national, or regional importance, which imposes appropriate requirements for building around the monuments, monument protection documentation is being developed for each monument.

As an example in Libya, we will cite the problems of preserving the historical environment with established buildings in the capital – the city of Tripoli. At the same time, historical traditions, architectural features of buildings, and compliance with natural and climatic conditions are often not taken into account. Uncontrolled implementation of modern forms of architecture without understanding the national specifics leads in some cases to the loss of authenticity of historical quarters.

Despite the difficulties that arise and the weak control of these processes by the monument protection structures, the Libyan state takes certain steps to preserve and restore the Islamic architectural heritage and its popularization in the world (Figs. 4 – 6).

The protection and management of all cultural heritage sites on the territory of Libya was entrusted to the specially created Department of Antiquities and the Libyan National Centre for Documentation and Research.

A separate issue is the legal basis for the protection of cultural heritage. In particular, the Libyan state adopted a list of laws and regulations aimed at protecting Islamic cultural heritage from damage and destruction. These laws prohibit any unauthorized alteration or destruction of cultural heritage sites.

One of our main activities is to fund programs for the preservation and restoration of Islamic cultural heritage. The Libyan government has allocated funds for the restoration of the historic city of Ghadames, which is a UNESCO World Heritage site.

As already mentioned, the educational one aimed at informing the population about the importance of preserving cultural heritage objects has been singled out as a separate direction.

Closely related to this direction is the governmental direction of international cooperation, for example, with UNESCO on the creation of a list of cultural heritage and a database for documenting and protecting cultural heritage objects.

There are several laws in force in Libya regarding the protection of Islamic monuments. The Antiquities Act 1971 provides general protection for all antiquities and monuments, including those relating to Islamic culture and history. The law requires that any excavation, restoration, or alteration of Islamic monuments be carried out under the supervision of the Ministry of Culture or an appropriate authority



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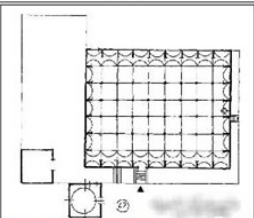
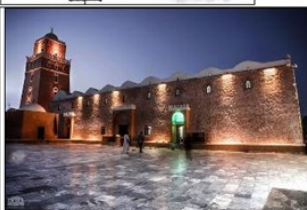
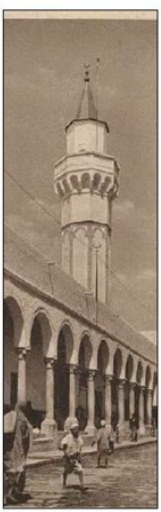



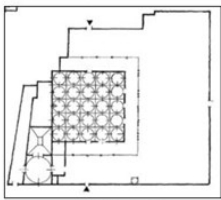

MURAD AGHA MOSQUE / TRIPOLI CITY		Period 1552: AD		dynastic: Othmans		
FRONT VIEW	ARCHITECTURE			DECORATION		
<p>The mosque has the attributes of a traditional Moroccan mosque since then, It was built by leading Moorish architects under the supervision of Tunisian engineers by more than 300knights-slaves of the Order of St. John.</p> 	<p>HEIGHT</p> <p>a square tower with a length of 14m</p>	<p>LENGTH</p> <p>it is circa approximately 75m</p>	<p>NUMBER OF ELEMENTS</p> <p>25dome + 48columns the wall thickness 0.40cm</p>	<p>MATERIALS</p> <p>traditional building materials such as adobe</p>	<p>In the architecture of the mosque, Berber features were combined with ancient ones, as the 48marble columns in the interior were taken from the Roman ruins of Leptis, two hundred kilometers east of Tripoli. The columns are arranged in traditional Moroccan horseshoe arches that support the vault. The minaret on the side of the courtyard is characteristic of Moorish architecture</p>  <p>Openings: The building is distinguished by its high walls covered with stone and medium windows for the lower floor, which number 12windows, while the upper floor has 32small windows distributed on the four sides it has 5doors.</p>  <p>Domes: Slarge rectangular domes in the middle of the roof and 18small square domes distributed on both sides of the mosque</p> 	
	<p>plan</p> 					
	<p>outside look</p>					
AHMAD PASHA AL QARAMANLI MOSQUE / TRIPOLI CITY		period 1736: AD		dynastic: Othmans		
FRONT VIEW	ARCHITECTURE			DECORATION		
<p>The mosque has a minaret that stands apart from the building and overlooks the Al-Mushir market. The minaret is on a square concrete base, octagonal in plan, with a diameter of about three meters and a height of 18m. The minaret ends in the form of an octagonal balcony, according to the Ottoman tradition. The doors of the minaret are also decorated with verses of the Qur'an from Surah Al-Jumua.</p> 	<p>HEIGHT</p> <p>a square tower with a length of 16m</p>	<p>LENGTH</p> <p>it is circa 250m 5Doors</p>	<p>NUMBER OF ELEMENTS</p> <p>25dome + 100columns the wall thickness 0.40cm</p>	<p>MATERIALS</p> <p>traditional building materials natural</p>	<p>Since the Ottoman Islamic school gravitates towards sophistication and polychromy, these features are also present in the Ahmed Pasha Mosque, where the walls of the prayer hall are decorated with polychrome faience tiles with intricate designs and sacred inscriptions that repeat.</p>  <p>Openings: Five separate doors lead to the mosque, two in the north wall, two in the west, one in the east. The mosque building is illuminated by a large number of windows, among them stained glass windows.</p>  <p>Decorative accents located nearby are a mihrab in the wall of the qibla, completed by a Maghrib arch, around which is a minbar pulpit with an emphatically porous high staircase, under which there is a passage. The interior gives the impression of oversaturation with decor. The strip that surrounds the arch of the mihrab is traditionally decorated with lines from the Koran (Qur'anic verses) written in the Kufic writing technique.</p> 	
	<p>plan</p> 					
	<p>outside look</p>					

Fig. 4. Sample of monument protection documentation.


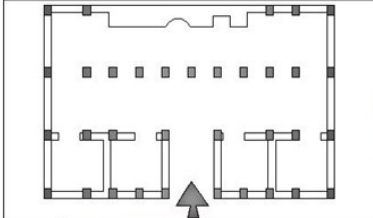








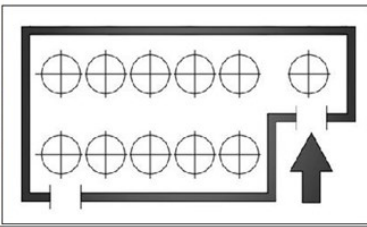






AL ATIQ MOSQUE / GHADAMS CITY		period 668: AD		dynastie: Islamic Conquest		
FRONT VIEW	ARCHITECTURE			DECORATION		
	HEIGHT	LENGTH	NUMBER OF ELEMENTS	MATERIALS	<p>Among the most prominent components and landmarks of the mosque is the House of Prayer, which is trapezoidal and has two minarets in the Moroccan style, with a square base and a rectangular body, with the difference in the shape of the balcony, which is in the style of Ghadamassi architecture. The old one and the other in the modern style</p>	
	a square tower with a length of 8m	its area is approximately 300m	1dome 28columns the wall thickness 0.40cm	traditional building materials such as adobe		
	<p>plan</p> 					 
outside look	 			 	<p>dome: its rests on a small square with one widow in each direction.</p> <p>external features of the elements of the mosque.</p>	
AL ATIQ MOSQUE / Aujelah CITY		period 666: AD		dynastie: Islamic Conquest		
FRONT VIEW	ARCHITECTURE			DECORATION		
<p>It is a building with a very distinctive architectural shape, and it is in the form of a semi-rectangular obtuse angle, with a length of 124 meters and a width of 19 meters, with a total area of about 456 (square meters). The mosque is surrounded on all four sides by a courtyard with a width of 4 meters and has 9 doors.</p>	HEIGHT	LENGTH	NUMBER OF ELEMENTS	MATERIALS	<p>floor: It is dirt, compact sand stones.</p> 	
	a square tower with a length of 7m	its area is 19 24 456m 9Doors	25dome 39columns the wall thickness 0.40cm	traditional building materials natural clay (red, white), limestone		
	<p>plan</p> 					  
	outside look				 	<p>Openings: They are considered very small to protect the building from high temperatures and air entering the building. It has 3 different entrances.</p> <p>Exterior color: The façades are clad with a clay material that reflects temperatures and a light sand color.</p> <p>Domes: The mosque is distinguished by the presence of 25 conical domes inspired by the environment of African desert architecture, which disperses the sun's rays.</p> <p>Minarets: They are dominated by the conical-shaped stairway minaret style, which resembles domes.</p>

Fig. 5. Sample of monument protection documentation.



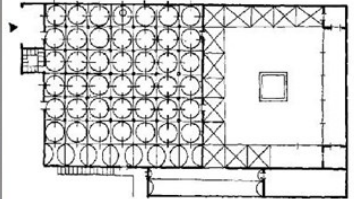


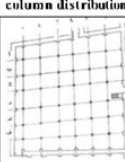



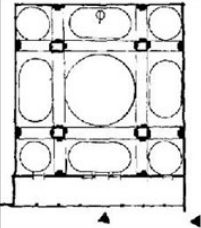




ALNAQA MOSQUE / TRIPOLI CITY		period:med-tenth century		dynastie: fatimid	
FRONT VIEW	ARCHITECTURE			DECORATION	
	HEIGHT	LENGTH	NUMBER OF ELEMENTS	MATERIALS	<p>It is said that this mosque was rebuilt in the year 1019AH 1610/ AD by Safarbay, and this is what came in a marble plaque found in it indicating its construction, so that it connects this mosque with the Great Mosque.</p> <p>The mosque is distinguished by the presence of a prominent courtyard, like the rest of the mosques of the first Islamic stage.</p> <p>The minaret: is square in shape, about 10meters high.</p> <p>Holes 5: small holes parallel to five other holes for a total of 10holes on each side.</p>
	a square tower with a length of 10m	39.40 + 29.35m 20.30 + 19.35m total area 900m	42dome 26column the wall thickness 0.40cm	traditional building materials such as adobe	
	plan				
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">outside look</p> 	plan				
					
	column forms		column dimensions		
					
column distribution					
AL ATIQ MOSQUE / BENGHAZI CITY		period 1577:AD		dynastie: Othmans	
FRONT VIEW	ARCHITECTURE			DECORATION	
	HEIGHT	LENGTH	NUMBER OF ELEMENTS	MATERIALS	 <p>How ever, this transfer, as evidenced by the manuscripts he prepared, believed that the entrance in front of the mosque which contains three openings that end with semi-circular arches, is the Old Mosque, because this mosque is as not clearly seen from the municipal square due to the presence of shops in front of it of the same height.</p>
	a square tower with a length of 13m	24 + 19 total area 456m	Grand dome 4 small domes 16columns the wall thickness 0.40cm	traditional building materials such as adobe	
	plan				
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">outside look</p> 	 <p>It is one of the royal mosque with a central plan, where a large dome dominates surrounded by half dome to support it from the four axes, and four domes in the four corners of the house of prayer (with some minor difference that does not harm the essence).</p> <p>Although the architectural elements and forms in these buildings reflect a well-known local architectural style before the Ottoman period, the Libyan mosque with a large dome, on the other hand, reflect the influence of the Ottoman architectural and artistic school.</p>				
	column forms		column dimensions		
					
column distribution					
column distribution				 <p>The four main features that most mosque have are: mihrab (niche), minaret (tower), qubba (dome) and wahn (courtyard). Mihrab and wahn are required for the functionality of all mosque.</p> <p>Islamic geometric patterns are derived from simple designs used in earlier cultures Greek, Roman and Sasanian. They are one of three forms of Islamic decoration, the others being the arabesque based on curving and branching plant forms, and Islamic calligraphy; all three are frequently used together.</p>	

Fig. 6. Sample of monument protection documentation.

In addition, the Islamic Architecture Registration Law of 2005 specifically focuses on the preservation and promotion of Islamic architectural heritage in Libya.

This law stipulates that all buildings of Islamic architectural value must be preserved, and any alterations or renovations must be done following the original design and structure.

In addition, the Libyan Antiquities Authority is responsible for overseeing the implementation of laws and regulations related to cultural heritage, including Islamic monuments. The Authority has the authority to issue restoration or excavation permits and oversee the preservation of Islamic monuments and other cultural heritage sites, while the Libyan government has taken measures to protect Islamic monuments in the country through various legal frameworks and institutions.

Each of the specific urban centres (Tripoli, Benghazi, Ghadames, Sebha) has a rich history. For example, the city of Ghadames was shaped by the influence of many different periods, starting with the Carthaginians BCE and then the Greeks and Romans until it was conquered by the Muslims and under Ottoman rule, in addition to being an important station for trade caravans and connecting the north with the south. In 1986, at the 10th session of the United Nations Educational, Scientific and Cultural Organization (UNESCO), ancient Ghadames was designated as a historical city and included in the protected register.

On the other hand, there are various aspects of cooperation between Libya and the UN aimed at preserving the Islamic architectural heritage in Libya. One of the key initiatives in this area was the creation of UNESCO World Heritage sites in Libya.

UNESCO World Heritage Sites in Libya include the archaeological site of Sabratha, the archaeological site of Leptis Magna, and the rock art sites of Tadrart Akakus. These sites contain numerous examples of Islamic architectural heritage, including mosques, public buildings, and residential structures. The United Nations Educational, Scientific and Cultural Organization (UNESCO) provided Libya with technical and financial assistance for the preservation and restoration of these sites. This assistance included funding for conservation and restoration projects, as well as technical expertise and training for Libyan conservation experts.

In addition to these efforts, the United Nations Development Program (UNDP) is also involved in initiatives aimed at preserving Libya's cultural heritage. For example, UNDP supported the establishment of a cultural heritage cadastre in Libya, which aims to document and catalog the country's cultural heritage sites, including Islamic architectural heritage.

Cooperation between Libya and the United Nations in the preservation of Islamic architectural heritage is a multifaceted activity that includes some initiatives aimed at documenting, preserving, and restoring important cultural heritage sites in Libya.

UN initiatives in Libya can contribute to the documentation and preservation of Islamic architectural heritage in several ways: architectural research, mapping, and documentation, conducting field surveys to identify and document historic buildings, monuments, and sites, and creating comprehensive inventories and databases.

The UN can provide technical expertise and capacity-building programs to train local professionals, such as architects, archaeologists, and conservationists, in cultural heritage conservation. This will enhance Libya's ability to document and preserve its Islamic architectural heritage using internationally recognized methods and best practices.

The UN can support conservation and restoration projects of significant Islamic architectural sites and buildings in Libya. This includes guiding conservation methodologies, materials, and techniques to ensure effective and sustainable conservation activities.

The UN can help raise awareness among the Libyan people about the value and significance of their Islamic architectural heritage. This can be done through educational programs, public campaigns, and cultural events that highlight the importance of preserving and appreciating these architectural treasures.

The UN can facilitate international cooperation and partnership between Libya and other countries or organizations that have experience in preserving Islamic architecture. This could include knowledge sharing, joint research projects and sharing of best practices to support Libya in its conservation efforts.

The UN can assist Libya in developing and implementing policies, regulations, and legal frameworks that promote the protection and preservation of its Islamic architectural heritage. This may include advising on heritage law, planning regulations, and heritage management strategies.

Although a large number of historical mosques have been preserved in Libya, a significant part of them is in an unsatisfactory condition and require restoration measures. For example, Al-Basha Mosque in Al-Khums, Sidi Salem Al-Mashat Mosque in Janzour.

Some historic mosques from the Ottoman era and before still exist to this day, but they are dilapidated and in need of restoration, such as Al-Naq Mosque, Al Atiq Mosque of Ghadames, Al Atiq Mosque of Aujeiah, especially after the period of Italian colonization and the First and Second world wars, during which most mosques and historical buildings were destroyed. The Department of Antiquities carried out simple restoration measures for some of them, but these were insufficient due to a lack of personnel and restoration experience.

From the end of the last century and the beginning of the new millennium, the construction of modern mosques spread with the support of the state, but the situation with the reconstruction and restoration of historical mosques remained unsatisfactory.

When designing modern mosques in Libya, it is recommended to take into account the following architectural, planning, and compositional regularities and techniques, taking into account the most common types of mosques, which are the Libyan Arab dome mosque, Ottoman-style mosques, and Moorish style:

- Islamic architectural principles: adherence to Islamic architectural principles that emphasize simplicity, symmetry, and geometric patterns. This includes incorporating elements such as arches, geometric motifs, and calligraphy into the design;

- planning of the mosque: following traditional Islamic principles, includes the placement of the prayer hall (musalla) in the direction of the Qibla (the direction of Mecca) and the arrangement of separate places for ablution for men and women;

- the design of the dome: a combination of small and large domes, the dome can crown the central prayer hall or determine the position of the mihrab. The shape and number of domes used, such as hemispherical, conical, or onion-shaped, may vary depending on regional or historical influences;

- materials: appropriate building materials that are optimal for local natural and climatic conditions and traditions (local stone, clay brick, wood, plaster for decorative elements);

- decoration: decorative ornaments with geometric patterns, calligraphy, and floral ornaments (dome, walls, entrance, and interior);

- courtyard and portico: the courtyard can be integrated into the design of the mosque, surrounded by covered porticos (riwaq), the portico can provide shade, access to the prayer hall, and space for public events;

- minaret style: as in Ottoman-style mosques or Moorish-style, the minaret acts as a visual focus and a place for the call to prayer. The design and height of the minaret must be in

harmony with the overall architectural style of the mosque (square base and cylindrical body – Ottoman, square in plan – Moorish);

- natural lighting and ventilation: the mosque is designed to provide natural lighting and mutual ventilation, taking into account the placement of windows, skylights, and airflow patterns to ensure a comfortable environment for worshipers;

- accessibility: the design of the mosque should ensure accessibility for all persons, including entrances and corridors, as well as the factor of inclusion;

- environmental friendliness: energy-efficient lighting, natural ventilation, and water-saving systems.

## Conclusions

As a result of the research, it was proven that each period was influenced by special circumstances that contributed to the formation of the characteristics of mosques, starting with a simple traditional Arab mosque of square or rectangular shape (the Libyan mosque with Al-Qubaybat) and ending with the Ottoman mosque, which has a characteristic architectural form, aesthetic and decorative elements, attractive colours. The architectural development of the plans and forms of mosques in Libya did not depend on the political system and successive periods of rule, but rather on the degree of development and change that occurred in the form and general planning of the Islamic school of architecture in neighbouring countries and Islamic countries in general. These architectural periods can be summarized into three main periods, each of which includes secondary periods.

Three main periods of mosques in Libya were distinguished. The early period of the introduction of Islam in Libya dates from 641 – 749. The mosque plans of this period were simple in form and relied on the basic elements of the mosque, such as the prayer hall, which should accommodate the appropriate number of worshipers, and the simple mihrab, devoid of decorations, indicating the direction of prayer. The qibla was devoid of complexity and decoration. The simple materials used for construction and weather factors played an important role in shaping the Islamic school of architecture in Libya during that period.

The middle period is dated 750 – 1550. It was marked by the continuation and expansion of the architectural achievements of the early period, while the middle period included different systems of government, and the plans and architectural forms of mosques did not differ significantly from the early period. This period was characterized by mosque plans with a special rectangular and square plan shape, with a roof structure with small domes, and a lack of decoration, except for some calligraphic decorations with verses of the Qur'an in simple lines at the entrances or in the prayer hall, and the appearance of square-shaped minarets in the plan with decor in the Moorish style.

The late period dates from 1551 – 1911 and is divided into 3 sub-periods (the first Ottoman period, the Karamanli period, and the second Ottoman period). This is the period of Ottoman influences, attention to decorative and aesthetic elements such as arches, large domes, and naves, as well as decorative and calligraphic bands, which were mixed with local traditions and the style of mosque construction.

Analyzing the internal and external factors that influenced the development of the Islamic architectural school in Libya in different periods from the beginning of the introduction of Islam in Libya to the end of the Ottoman rule, we notice the difference in the plans and forms of mosques. and the trend from a focus on the basic elements of the mosque to a focus on aesthetic elements and decoration. This is visible in such elements as minarets, domes, arches,

internal marble cladding of elements of the prayer house, and entrances and complex geometric shapes.

The features of the national identity of Libyan mosques can be expressed through the traditional Libyan mosque (mosque with small domes), with a rectangular or square plan and a square minaret, similar to the Maghreb type, but with some Ottoman modifications and the use of elements from ancient monuments in the interior.

The regional desert type of the mosque, which was formed under the influence of natural and climatic conditions (similar to the regional type of the Ibadite mosque in the Mزاب Valley in Algeria), is separately highlighted. These mosques are as simple as possible, with a flat wooden roof and a small protruding minaret.

In each period, there were several planning schemes for mosques and the most common type of plan was the multi-bay multi-domed mosque type, similar to the Anatolian Ottoman mosques. The plan was a multi-cell scheme with square cells, from which columns surmounted by arches emerge, and each cell is topped with flat domes. The second and third periods are mostly characterized by irregular plans and greater complexity of planning compared to the first period and a shift in emphasis to decoration.

Three main regions of the formation of the Islamic architectural school of Libya were identified: Western Libya (Tripoli region), Eastern Libya (Cyrenaica province), and South (Fezzan province). The characteristics of mosques in each region are defined:

a) Western Libya (Tripoli region) – characterized by multiculturalism due to continuous wars and several systems of government at the beginning of the introduction of Islam and Ottoman rule for four centuries. Arab, Maghreb, and Ottoman architectural traditions will be combined;

b) Eastern Libya (Cyrenaica province) – characterized by multiculturalism as a result of numerous conquests and invasions. Ottoman, Andalusian (Azhdabia, Benghazi, Derna), and local traditions are combined;

c) South (Fezzan province) – characterized by regional uniqueness due to isolation from external influences due to desert natural and climatic conditions (Ghadames, Sabha, Aujila).

The main element that expresses the Libyan national identity is found to be the small, symmetrical domes that distinguish the Libyan traditional mosque roof style from other neighboring countries and other Islamic countries, as they have become a distinctive and unique feature derived from local traditions that have preserved its continuity despite demographic and political changes over the centuries.

The changes that took place in the form and style of construction and decoration in the Libyan Islamic school of architecture during successive periods of rule were also analyzed, and the influence of foreign traditions and cultures was traced as a result of the invasion, migration, and the involvement of skilled craftsmen from other schools of architecture in Andalusia, Tunisia, Morocco, and Türkiye.

The Moorish square-shaped minaret with a balcony, the Ottoman minaret with a square base and a cylindrical body ending in a muezzin balcony and a conical dome, and a structural scheme with large central vaults and domes have been identified as borrowed forms. Derived from Ottoman traditions is the tendency to move away from focusing only on the functional solution of the mosque building to paying attention to aesthetic and decorative elements.

The role of mosques in the formation of the urban structure of Libyan cities was studied, as the mosque played a key role in the formation of the city plan as a reference point for the distribution of various architectural spaces such as schools, markets, and roads, since mosques were built in prominent places accessible to everyone. The role of the mosque was not limited

to a place of worship and prayer but included all other aspects of social and cultural life. Mosques have become the most important landmarks that represent the image and features that reflect the identity of the city, which had a clear impact on the general shape of the surrounding buildings, public spaces, streets, and alleys, as well as on the aesthetics of the city. The role of mosques in the management of water resources was important, especially in southern Libya, where many of the mosques contained wells or reservoirs, which were one of the most vital resources serving all components of the city.

Each city or region had its own natural and climatic conditions, in addition to the materials available in each of them, which differed from the others, and all this was reflected in the general form of mosques, structural structure, and general features of each city.

It has been proven that the architectural-planning, compositional-constructive styles of the mosques of Libya are more similar to the Maghreb countries of Tunisia and Algeria and partly to Morocco, therefore, it can be considered that Libya, Tunisia and Algeria constitute a similar architectural Islamic school, which differs in each country by some traditions, local styles, and historical developments, but they are connected by interconnections, historical influences, cultural and economic exchanges between them, as well as experiences passed down through technicians and craftsmen.

All these factors contributed to the formation of the Libyan Islamic architectural school and other schools of the Maghreb, in addition to the direct influence of the Ottoman, and to a lesser extent, the Andalusian and Persian schools.

Taking into account historical architectural, planning, and composition techniques, it is possible to create traditional Libyan mosques that embody cultural and religious heritage. It is not recommended to build mosques of types that are not compatible with the natural and cultural features of Libya, taking into account the special national traditions of the construction of modern mosques in Libya, taking into account the continuous neglect and destruction to which it has been subjected during conquests, continuous wars and successive periods of rule.

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