



RESEARCH ARTICLE

Study of the ornamentation of Bhong Mosque for the survival of decorative patterns in Islamic architecture



Madiha Ahmad^{a,b}, Khuram Rashid^{b,*}, Neelum Naz^c

^aDepartment of Architecture, University of Lahore, Pakistan

^bDepartment of Architectural Engineering and Design, University of Engineering and Technology, Lahore, Pakistan

^cDepartment of Architecture, University of Engineering and Technology, Lahore, Pakistan

Received 15 November 2017; received in revised form 15 March 2018; accepted 16 March 2018

KEYWORDS

Bhong Mosque;
Decorative patterns;
Categorization;
Geometry;
Arabesque

Abstract

Islamic architecture is rich in decorative patterns. Mosques were constructed in the past as simple buildings for offering prayers five times a day. However, in subsequent periods, various features of ornamentation in the form of geometry and arabesque were applied to the surfaces of mosques to portray paradise symbolically. This research applied descriptive approaches to examine the surviving patterns of the Aga-Khan-awarded Bhong Mosque and categorized these patterns as geometric and arabesque. This categorization was achieved by photography, use of software for patterns, and conducting interviews with local elderly persons in the region. The geometric patterns were simple 6- and 8-point star patterns. Several of the earliest examples of rosette petals exhibited 8- and 10-point star patterns and were categorized by incorporating the geometric style and location of mosques. This research investigated different arabesque categories and inscription types and determined the aesthetic and cultural reasons for their placement on various surfaces. Frescoes had different types of flowers, fruits, and leaves, and a few of them belonged to the local region.

© 2018 The Authors. Higher Education Press Limited Company. Production and hosting by Elsevier B.V. on behalf of KeAi. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

*Corresponding author.

E-mail address: khuram_ae@uet.edu.pk (K. Rashid).

Peer review under responsibility of Southeast University.

1. Introduction

A mosque or masjid for Muslims is a place of worship. In Arab countries, during the spread of Islam, mosques were constructed as simple buildings for offering prayers five times a day; however, in subsequent periods, various features of ornamentation in the form of geometry, arabesque, and calligraphy were applied to the surfaces of mosques to portray paradise symbolically (Othman and Zainal-Abidin, 2011). A complex vocabulary of patterns was established over time. Tawhid, the pillar of Islam, requires believers to oppose idols, and this requirement eventually led to the forbiddance of the representation of human beings and other animals, especially in ornamenting the surfaces of mosques. provided a detailed summary of the art and architecture that spread during periods of Muslim rule in the vast region of the Atlantic to India from 650 to 1250. The era from 1250 to 1800 was also examined by Blair and Bloom (1995). Meanwhile, Critchlow focused on the formation of multifaceted geometric patterns by starting sequentially from the primary building blocks of these patterns (Critchlow, 1976).

Pakistan is an Islamic country with numerous mosques characterized by high style diversity. Apart from Bhong Mosque, the other well-known mosques that are regarded as ideal examples of Mughal architecture are Badshahi Mosque, Masjid Wazir Khan, and Mahabat Khan Mosque in Pakistan (Ansari et al., 2016; Shah, 1999). A study was performed on *kashi kari* in Wazir Khan Mosque by Ansari (Ansari et al., 2016). A comparative study of Mahabat Khan Mosque was conducted by Shah (1999). Bagley revealed the hidden meaning behind the esoteric inscriptions used on the Taj Mahal, and this hidden meaning changed the perspective of readers regarding the renowned monument (Begley, 1979).

Pakistan has many cultural heritage buildings. However, although an attempt has been made to examine heritage buildings by using multi-analytical techniques (Gulzar et al., 2013), interest and information on historical materials and techniques are limited, and this limitation hinders further discussions of heritage sites. Preserving historical buildings is crucial; however, if these buildings require new additions, then compatibility must be ensured between the architectural decorations to be added and existing ones (Yüceer and İpekoğlu, 2012).

1.1. Historical background

Bhong is a village in Rahim Yar Khan District and situated 25 km from Sadiqabad. This village is in the southern part of Punjab, where it meets the provinces of Baluchistan and Sindh in Pakistan. Bhong is a meaningless word, but in the language of Baluchistan, a word close to bhong is “bhongu,” which means house. Bhong is assumed to be derived from the word “bhongu” that became common among the people of this region as stated by locals. Bhong Mosque was constructed not only for praying but also as a center of religious learning for the youth in its area (Figure 1).

The Aga Khan Award is a prize for excellence in architecture and was established by Aga Khan IV in 1977. In 1986, Bhong Mosque received the Aga Khan Award for Architecture



Figure 1 View of the modified Bhong Mosque (Picture is taken by the Author).



Figure 2 The old Bhong Mosque (Picture is taken by the Author).

in appreciation of the efforts exerted by a single individual, Raees Ghazi Mohammad, to establish a local center of learning and building crafts in the village of Bhong. A technical review report that highlights the intricacy of the materials used for the construction of Bhong Mosque was prepared for the award (Report, 1982).

Local stories indicate that Raees (the builder of the mosque) had a dream that showed him he would die after the completion of the mosque. In the early 1930s, a small mosque was built (Figure 2), followed by the construction of a *haveli*, which was a place of residence commonly referred to as a palace. When the *haveli* was in the completion phase, the mosque structure was upgraded (Report, 1982). With his dream in mind, Raees spent a large amount of capital on the construction, especially on the rich ornamentation of the mosque.

Approximately 200 skilled craftsmen worked in the construction of Bhong Mosque. These craftsmen were from various parts of the country and brought with them their *shagirds* (students and assistants), who also possessed the experience required to complete the set tasks precisely and accurately. Some of the details related to the origin of the labor forces are as follows. The master mason was from Bikanir, which is in Rajasthan, India. Painters and calligraphers were from Karachi. A few masons from Multan also

provided their expertise in crafts, such as woodwork, painting, tile glazing, and glass mosaic (Report, 1982). Muhammad Anwar, who was from Bhong, worked on glazed plaster. The craftsmen who did the work related to artificial stone and the majority of unskilled laborers were from Bhong. The artwork in the form of motifs and the different materials used in Bhong Mosque are commendable because according to Qadir Baksh, who claimed to have been involved in store keeping with his father at the time of the mosque's construction, they did not involve the use of any advanced machinery for cutting. The art of gilding was also extensively used in the *mihrab* of the main prayer hall of the mosque, and it gives the building an extravagant look. Most of the work was carried out by the craftsmen, and the landlord supervised all aspects of design and construction. The design of the building was laid out without preliminary drawings, but a draftsman was hired eventually; however, the entire work was completed without professional architects (Report, 1982).

According to the locals, repairs and changes in the mosque are ongoing, and stopping them will cause a loss

to the family. Therefore, with the passage of time, a few additions were made apart from changing the existing structure, and these included modifications in the front and back portions, the canopies, and the fountain. Various portions of the mosque were also defined with the newly constructed elements presented in Figure 3. The legend of this figure presents the various elements and the abbreviations used in the remainder of this work. Major construction of the complex began in 1932 and was completed in 1982 (great mosque) (Report, 1982). Maintenance of the structure and ornamentations of the mosque is reported to be continuous.

1.2. Ornamental work

Ornamentation is an essential part of Islamic architecture and can be categorized into three types: geometric, arabesque, and calligraphic patterns; the last one is the most commonly used in religious buildings. The first type, geometric, can be explained in various ways. Geometry is

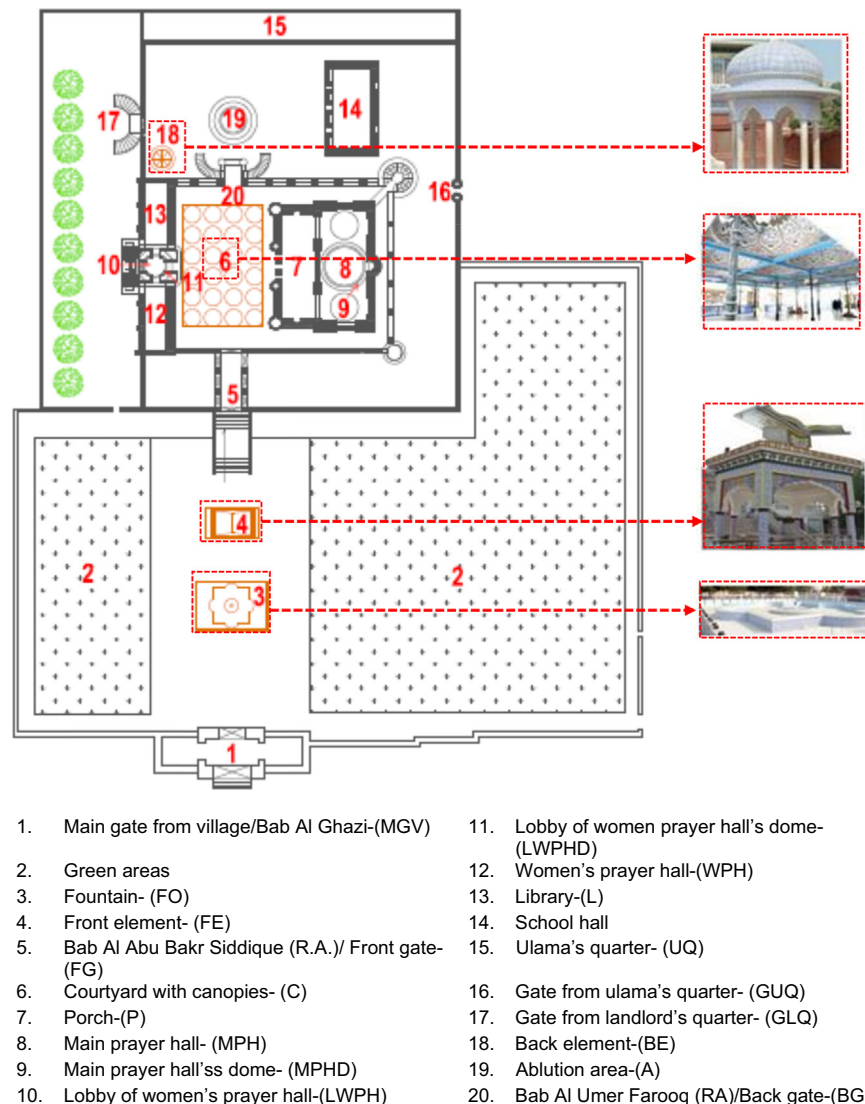


Figure 3 Modified plan of the mosque showing all elements (Picture is drawn by the Author).

defined as the science of properties and the relationship among points, lines, surfaces, or solids in space and the ways in which these parts fit one another (Dabbour, 2012). The significance of geometry is reflected by the statement believed to be engraved over Plato's Academy indicating that only a person who is familiar with geometry will be allowed admission to the institution (Critchlow, 1976). Although a few examples of the earliest geometric decorations can be traced to the surviving buildings of Islamic architecture by Muslims, development and expansion of geometry were observed during the 8th and 9th century due to significant advancements in science and mathematics in the Middle East, Iran, and Central Asia (Abdullahi and Embi, 2013). The data of Khwarizmi on geometry in the early 9th century are considered the earliest (Abdullahi and Embi, 2013). Various studies have revealed that the three primary plane shapes (i.e., equilateral triangle, hexagon, and square) that independently fill a surface are basic space-filling elements (Critchlow, 1976). These filling elements divide a plane into different forms, including star-shaped regions, with a star comprising the main core and with two types of shapes surrounding it (El Ouazizi et al., 2015). The geometric patterns used in Islamic architecture were explained in detail by El Ouazizi et al. (2015). Geometric rosettes are characterized by their center, order, and group of symmetry. Several types of patterns were made, including 6-, 8-, 10-, and 12-point rosette patterns. Different decorative motifs were also explained in other studies on mosques (Guralp, 1970; Nahhas, 2014; Othman and Zainal-Abidin, 2011; Shah, 1999).

The second type of motifs, in which forms from nature are used in the design, is called vegetal or arabesque. In this type, all motifs that resemble complete plants or parts of plants, such as their vines, tendrils, leaves, fruits, or flowers, are included. Muslims have consistently used trees and vine-like plants as decorative elements in the ornamentation of their buildings. Rose, lily, and various types of lotus are among the popular flowers used by Muslims (Al Faruqi, 1985). Similarly, palmette, half palmette, and grape leaves are frequently used in the ornamentation of buildings designed by Muslim architects and artisans (Al Faruqi, 1985). Apart from representations of real leaves, imaginary leaves are also utilized together. This type has the longest history in Islamic art among all types of Islamic motifs and is also the most commonly used in Islamic art and architecture. Particularly, this style was profoundly adopted by the Muslims of the Ottoman, Safavid, and Mughal periods (Nahhas, 2014).

1.3. Significance of the research

Art and architecture cannot be separated and exert a significant influence on mosque ornamentation. Different patterns were used in the past to adorn the surfaces of monuments. However, a mosque was selected as the topic of this research because it portrays the aesthetic features of motifs apart from the symbolical touch of paradise. Regardless of the material selected, the preoccupation of viewers is always drawn by the complexity of designs rather than the substance. This research helps in establishing a database of decorative patterns. In turn, this database may provide a

valuable contribution to enhanced awareness of this art form and revival of Islamic architecture that is expected to be replaced by western influence in the near future.

2. Methodology

The Islamic patterns used in the ornamentation of Bhong Mosque and their classification into various categories are the scope of this work. This research applied descriptive approaches, for which goals were set to collect data on surviving patterns with the aid of extensive photography. The patterns were then classified based on geometry and arabesque. Other methods included referring to published documents and conducting informal interviews with local elderly persons who are connected to the mosque in any capacity. In accordance with the ornamental details of the mosque, this work was divided into two sections, namely, geometry and arabesque.

2.1. Geometry

Several geometric patterns were used in Bhong Mosque. These patterns were listed in detail and divided into five types according to the number formation of star legs at the center of the pattern. Four types comprise 6-, 12-, 8-, and 10-point geometric patterns. The fifth category involves random, simple geometric shapes. The mosque has several well-defined portions, which include a prayer hall, a courtyard, and a library. Geometric patterns were defined in this work according to their location (prayer hall) and placement (internal side, external side, ceiling, or flooring). The acronyms used to define geometric patterns are presented in three parts separated by two dashes; the first letter presents the cataloguing of geometric shapes and denoted by "G," along with general numbering starting from 1. The middle part shows the placement of the pattern in a particular space, that is, internal side, external side, ceiling, and flooring, and presented by "IS," "ES," "C," and "F," respectively. The last part shows the particular portion of the mosque where the pattern was used (Figure 3). For example, G1-IS-P means geometric pattern no. 1 (G1) on the interior side (IS) of the porch (P). Manuscripts written by a few local craftsmen were considered to relate similar patterns and disclose a few local terminologies. AutoCAD software (2017 version) was used for this task.

2.2. Arabesque

Arabesque, which is known as *Tauriq* in the Gulf State, means foliage. Arabesque includes both types of ornamentation whether in stylized plant form or in the form of geometric interlacing (Burckhardt, 2009). However, in this work, arabesque was regarded as floral and vegetal patterns only, and its geometric aspect was ignored. The floral themes of this particular region were studied to determine if local flowers and plants were used in the fresco work for the adornment of various surfaces of Bhong Mosque. This parameter was further divided into six sub-categories according to the type of patterns. The first category includes the patterns used on the spandrel along with

scrolling vines with different designs. The second category is related to *Kerri* patterns, which are renowned in this region and frequently seen on fabrics. The third and fourth categories are the *Kingarah* and *Madakhil* forms, which are local terminologies obtained from the manuscripts of local craftsmen. The fifth category is from the universal symbol tree of life, which has different meanings in various cultures. Acanthus and palmette leaf motif categories are related to stylized leaf forms. The sixth category is the presentation of the movement of translational and rotational patterns. Arabesque patterns were abbreviated into three parts separated by two dashes in this study; the first letter presents the head Arabesque “A” along with the general numbering, and the second and third parts indicate the space and portion, respectively, from Section 2.1 and Figure 3. For example, A1-C-C means arabesque pattern no. 1 on the ceiling of the canopy.

3. Categorization of decorative patterns

Islamic motifs are broadly classified into three main categories, which are geometric, floral or arabesque (mainly considers stylized plant forms), and calligraphic patterns, which are the most essential Islamic adornment. Cataloguing of the first two types of patterns is explained in the following sub-sections.

3.1. Categorization of Geometry

Intricate geometric forms can be created out of octagons, squares, circles, and revolving squares. However, a brief description of Islamic geometric patterns reveals a 6-point star that originates from a hexagon, an 8-point star and 8-point rosette from an octagon, and a 10-point star and 10-fold rosette from a decagon. These patterns were classified as 6-, 8-, and 10-point geometric patterns in this work (Abdullahi and Embi, 2013). All types of geometric patterns used in Bhong Mosque are explained in the following sub-sections.

3.1.1. 6- and 12-point geometric patterns

The 6-point pattern was created by dividing a circle into six equal parts, and the 12-point pattern evolved by further subdividing it. Number 6 is a perfect number because it consists of $1 \times 2 \times 3$; this pattern is also equal to $1 + 2 + 3$. It not only describes the proportional height of a man, but it is also the sixth day of the Creation of Man. Number 6 also represents the six directions and is also known as the Seal of Solomon, which is created by combining two triangles that point in opposite directions. The six-sided hexagon is therefore considered a number that represents a human being, and 12 is the basic number of the Zodiac (Ardalan and Bakhtiar, 1973). The various types of 6- and 12-point geometric patterns used in Bhong Mosque are presented in Figure 4. The figure shows that 6-point geometric patterns were used on the internal side, external side, and ceiling of the mosque corresponding to the placement of P, MPH, and MG, respectively. Three types of color scheme were used at the porch to differentiate its parts and make them highly attractive, as shown in Figure 4(a), (c), and (d). Three types of 6-point geometric patterns were used in MPH, of which two were used to adorn the ceiling and one was placed on

the middle-recessed portion of the *mihrab*. Figure 4(b) and (c) show the same patterns, but the latter presents an interlacing effect by offsetting the outlines in the pattern and using different color palettes. Similarly, Figure 4(d) and (e) show the same patterns, but the variation in materials and playing with color changed the effect of both patterns entirely. Figure 4(f) and (g) are the same patterns. Another design of the 6-point star is shown in Figure 4(h). The only 12-point star pattern was observed on the IS of MG and is shown in Figure 4(i).

3.1.2. 8-point geometric patterns

Constructing an 8-point geometric pattern is simple. This pattern is formed by dividing a circle into eight equal parts to form an 8-point star at its center. This pattern is used to create designs by connecting various intersections, which can be observed in many Islamic decorations. An octagon symbolizes the eight angels who are bearers of the throne (Ardalan and Bakhtiar, 1973). The various types of 8-point geometric patterns used in Bhong Mosque are presented in Figure 5. These patterns were used in various locations, such as LWP, FG, MG, interior surfaces, and ceiling of (MPH), (FE), and (P). Notably, two types of 8-point patterns were used in the porch area to adorn the entire surface area of the ceiling with the craft “*Sheesha Kari*” (mirror work), which has been in existence in the Southern Punjab region for about two centuries. The surfaces of the porch area were embellished with mirror work. Figure 5(d) shows a modification of the Figure 5(c) pattern, whereas Figure 5 (e)-(g) are the same patterns with different types of materials and color schemes. Similarly, Figure 5(h) and (i) are similar patterns with different color schemes. A similar trend can be observed in Figure 5(j)-(l).

3.1.3. 10-point geometric patterns

The number 10 describes the basic disposition of the human body, and small variations in its constructional steps can lead to various design possibilities. This number is formed by dividing a circle into 10 equal parts. The three types of 10-point geometric patterns used in Bhong Mosque are presented in Figure 6. The first two patterns shown in Figure 6(a) and (b) are the same, except for the material and color scheme that were used at ES of WPH. Meanwhile, the third pattern was utilized to adorn the ES of MG, as shown in Figure 6(c).

3.1.4. Random geometric patterns

Aside from the various types of geometric patterns, random simple patterns were also used to adorn the surfaces of Bhong Mosque. A few of these patterns are presented in Figure 7. The first pattern in Figure 7(a) is simply the intersection of four circles, with the juxtaposition of floral motifs that were inscribed within another large circle. Figure 7(b) shows the repetition of octagons, and Figure 7 (c) and (d) contain triangular and rectangular shapes merged together, of which the first one adorns the interior door surface of the front gate (ID-FG). The motifs in Figure 7 (e)-(h) comprise a square placed at 45° , and those in Figure 7(i) comprise a square inscribed within another square. In Figure 7(j) and (k), the pattern is formed by the combination of two basic geometric shapes, namely, a

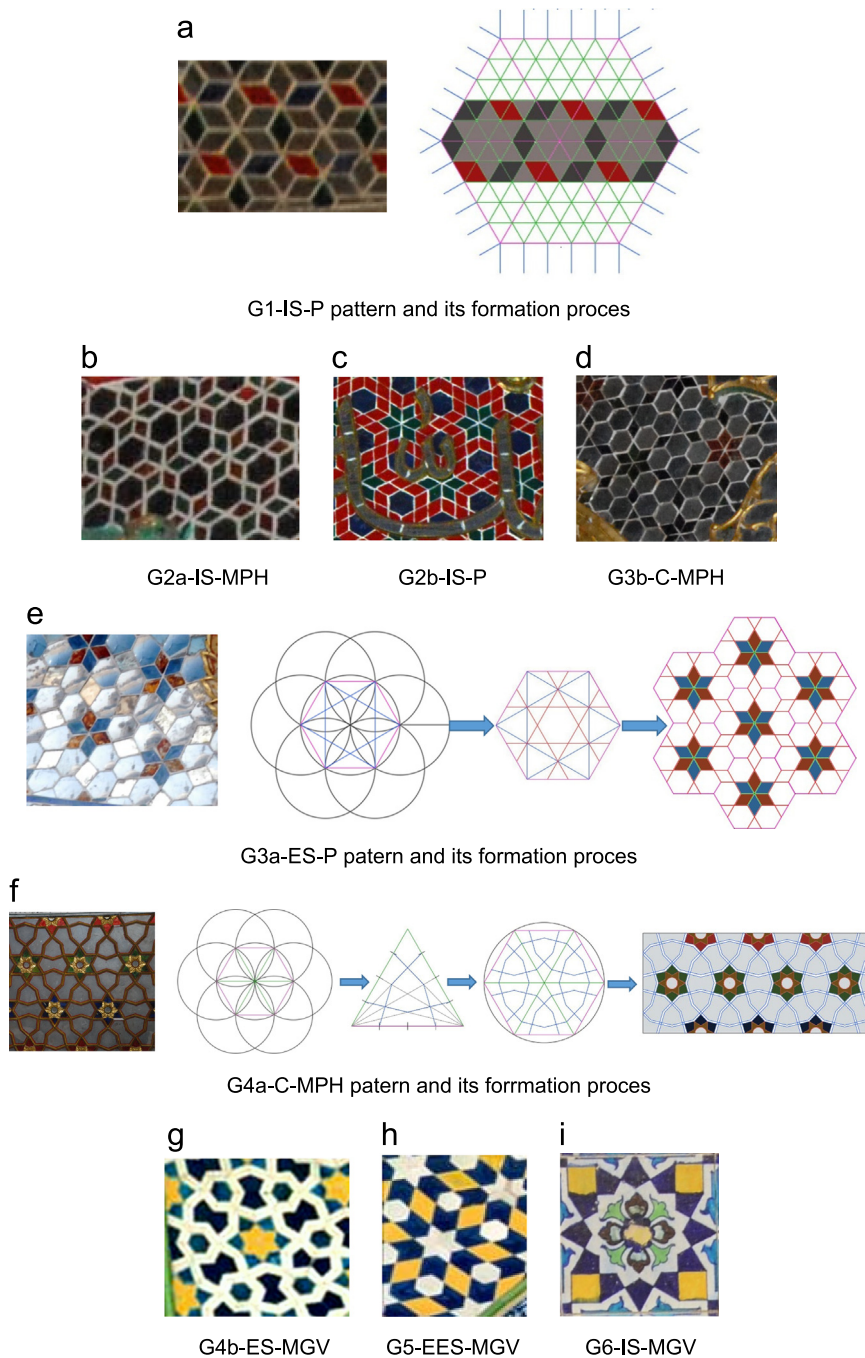


Figure 4 Various types of 6 and 12 pointed geometrical patterns used in Bhong Mosque (Pictures are taken and their formation process are drawn by the Author).

circle and a square. The last pattern is a combination of irregular geometric shapes, as shown in Figure 7(l).

3.2. Categorization of Arabesque

Arabesque has been used to decorate buildings, manuscripts, textiles, and other surfaces since its emergence. Arabesque is characterized by complexity, detail, delicateness, richness, and heaviness; it is sometimes abstract and sometimes natural. The arabesque of Bhong Mosque was divided into six categories in this work and is explained in the following sub-sections.

3.2.1. Category 1 - spandrel patterns with scrolling vines

Scroll is an ancient form of art in which incomplete circles, mostly representing the vine form of plants with flowers and leaves typically attached to them, were used. This form, together with other arabesque patterns, were used on the spandrels of most arches in Bhong Mosque, as shown in Figure 8. Most of the patterns have scrolling vines, except for that in Figure 8(d), and were used on external and internal sides of GUQ and GLQ, respectively, as shown in Figure 8(b) and (c). The scroll was also used on internal sides of MPH, P, and MGV, as shown in Figure 8(d)-(h).

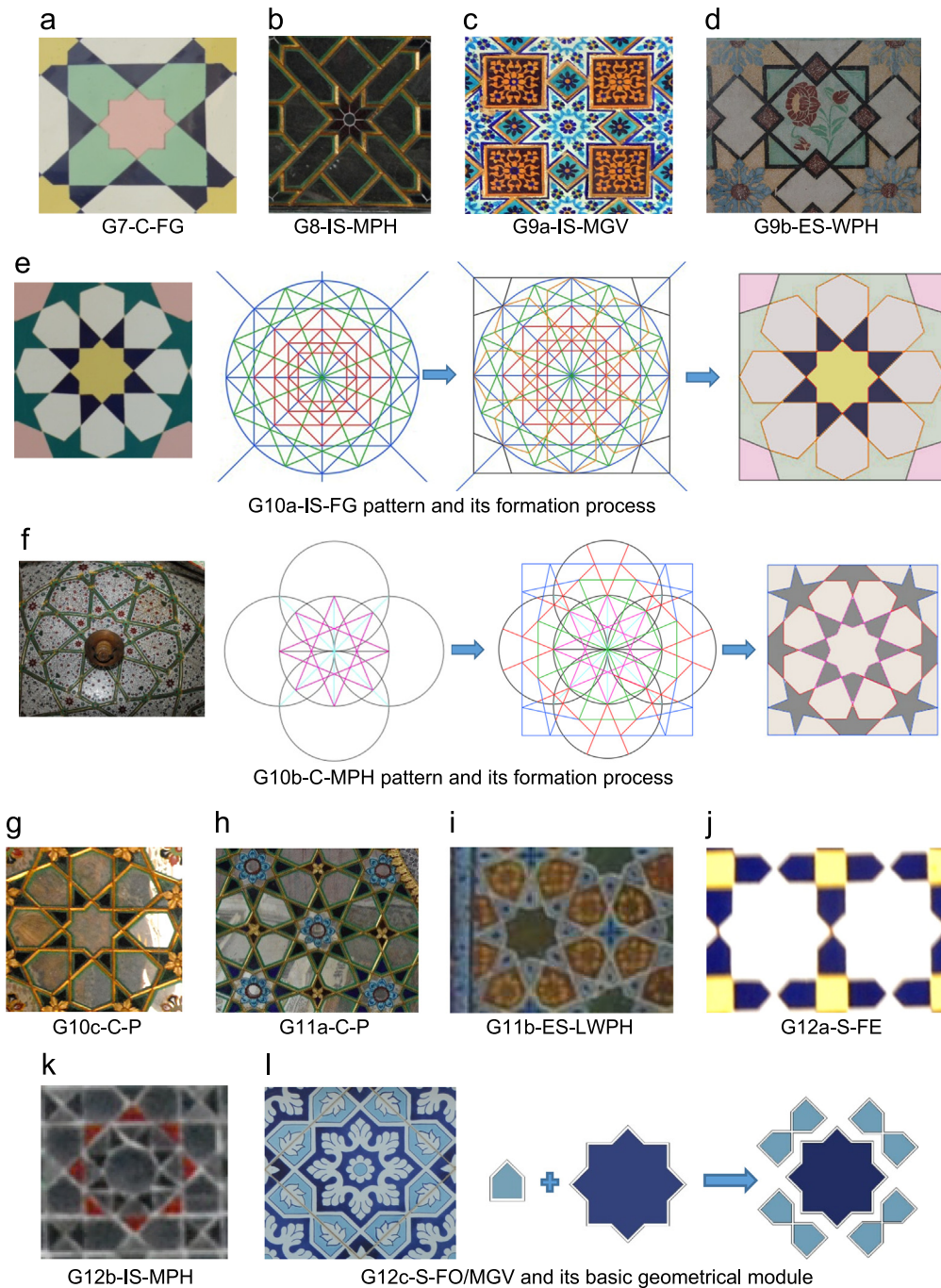


Figure 5 Various types of 8 pointed geometrical patterns used in Bhong Mosque (Pictures are taken and their formation process are drawn by the Author).

3.2.2. Category 2 - Kingarah and Madakhil Forms

A few of the elements drawn in the manuals of *Ustads* (craftsman) (Figure 9) belonging to Multan are highly similar to the ones used in Bhong Mosque (Figure 10). In local terminologies, these elements are known as *Kingarah* and *Madakhil* forms. The motif in Figure 10(a) is similar to *Lahori Kingarah*, and that in Figure 10(d) is similar to *Double Madakhil*, as indicated in the design manual of *Ustad Rahim Bukhsh* (Figure 9), who was also involved in the ornamentation of Bhong Mosque at that time (Report, 1982). The motif

in Figure 10(e) was identified from the manual of Saif-ur-Rehman, a local craftsman. All of these motifs were used to adorn the external surfaces of LWPH and UQ. The motifs presented in Figure 10(b) and (c) were used on the external side of the domes above LWPH and MPH, respectively.

3.2.3. Category 3 - Kerii pattern

Paisley, which is locally known as the *Kerri* pattern, is shaped as a droplet and is under the vegetal motif of Persian origin. Three forms of *Kerri* patterns were used in Bhong

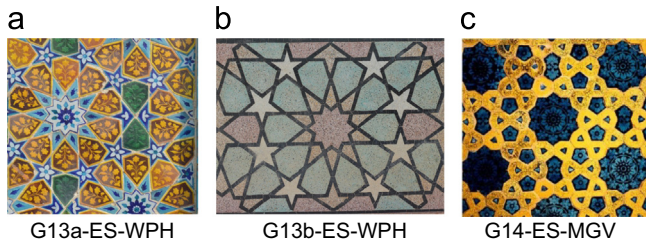


Figure 6 Various types of 10 pointed geometrical patterns used in Bhong Mosque (Pictures are taken by the Author).

Mosque, as shown in Figure 11. All of these patterns were used on the external and internal sides of the porch but with different materials. The floral patterns shown in Figure 11 (a) and (b) are similar. The internal droplet pattern shown in Figure 11(c) is densely filled.

3.2.4. Category 4 - Tree of life and other flowering plant patterns

Different types of trees are mentioned in the Quran. Examples include palm tree, olive tree, the tree that Allah used to provide shade for Hazrat Yunus (R.A.), and the tree of

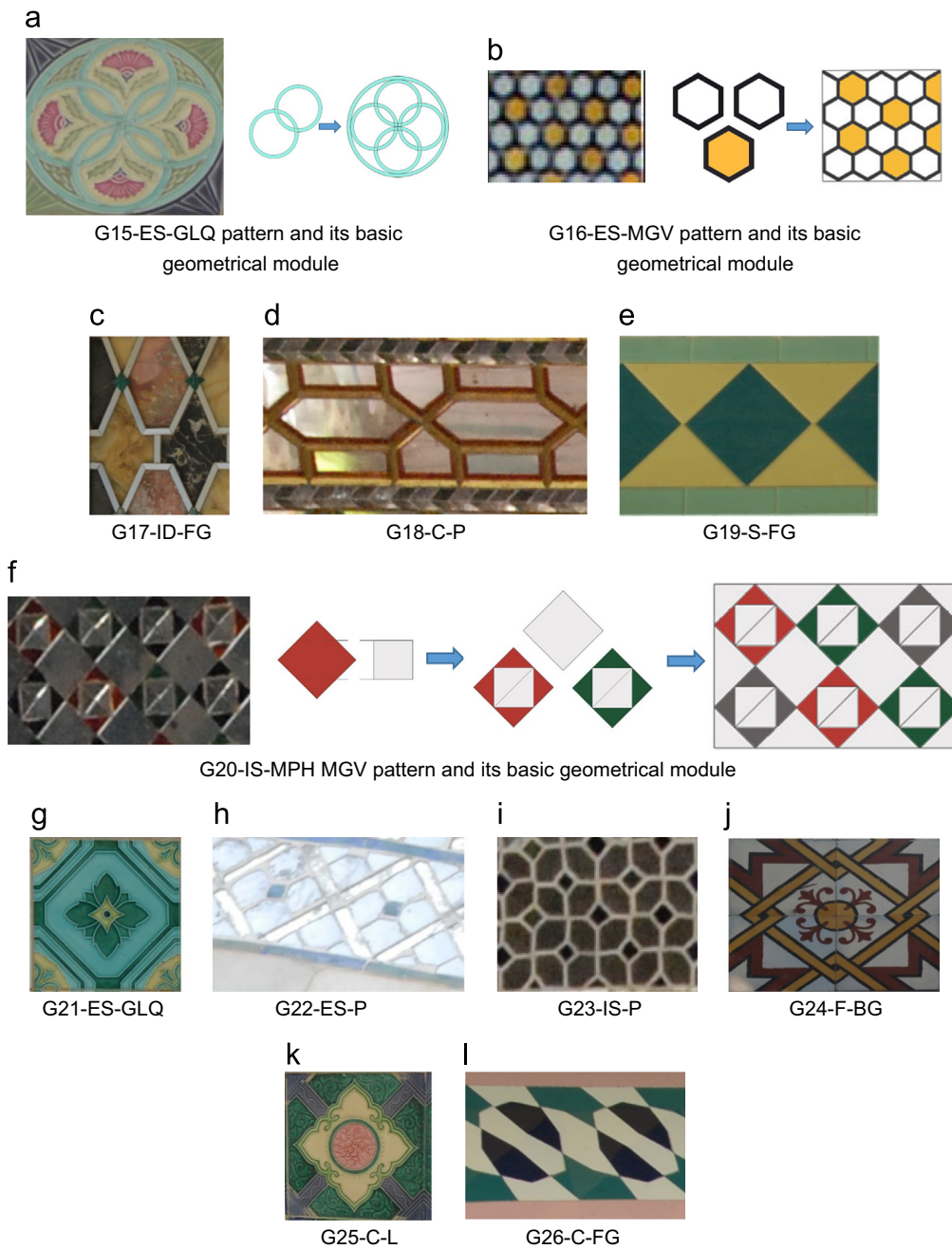


Figure 7 Random geometrical patterns used in Bhong Mosque (Pictures are taken and their formation process are drawn by the Author).

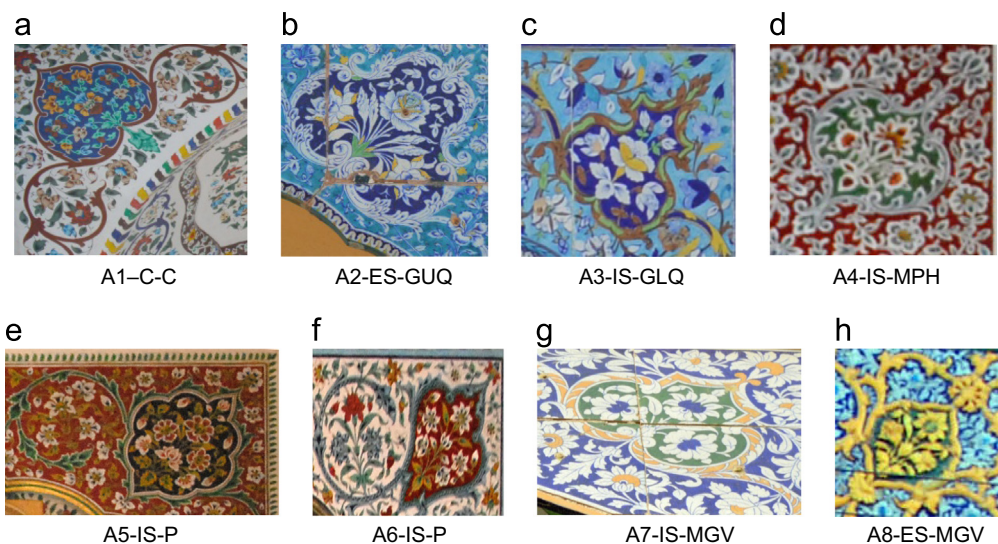


Figure 8 Arabesque patterns used on the spandrels of Bhong Mosque (Pictures are taken by the Author).

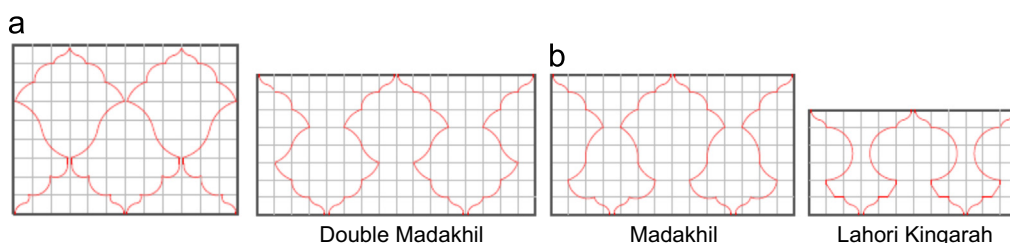


Figure 9 (a) Element from manual of Saif-ur-Rehman (Saif-ur-Rehman). (b) Elements from design manual of Ustad Rahim Bukhsh (Bakhsh, 1970). (Drawn by the Author).

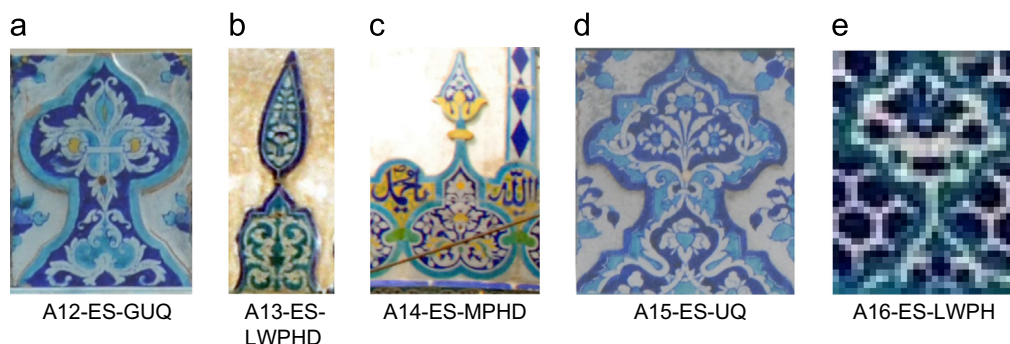


Figure 10 Different forms of Arabesque; Kingarah and Madakhil in Bhong Mosque. (Pictures are taken by the Author).

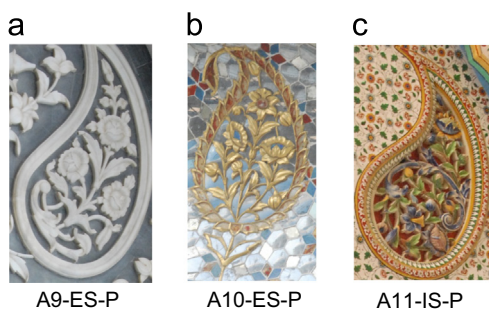


Figure 11 Different types of Kerii patterns used in Bhong Mosque. (Pictures are taken by the Author).

Zaqqum (assumed to be the food of the people of hell). The tree of eternity is considered the “giver of life” and is thus depicted in the tree of life motif. Although every culture has its own version of the tree of life, this symbol exists in all cultures. Aside from life, this tree also represents abundance. Mesopotamia is the origin of this motif (Ajrloo and Takavar, 2014). Bhong Mosque is also decorated with various types of tree of life motif along with flowering plants, which are listed in Figure 12. Figure 12 (a)-(d) present the motifs that bear flowers with fruits on their branches and mainly used on the internal side of MPH, except for that in Figure 12 (a), which was used on the recessed internal part of MGV.

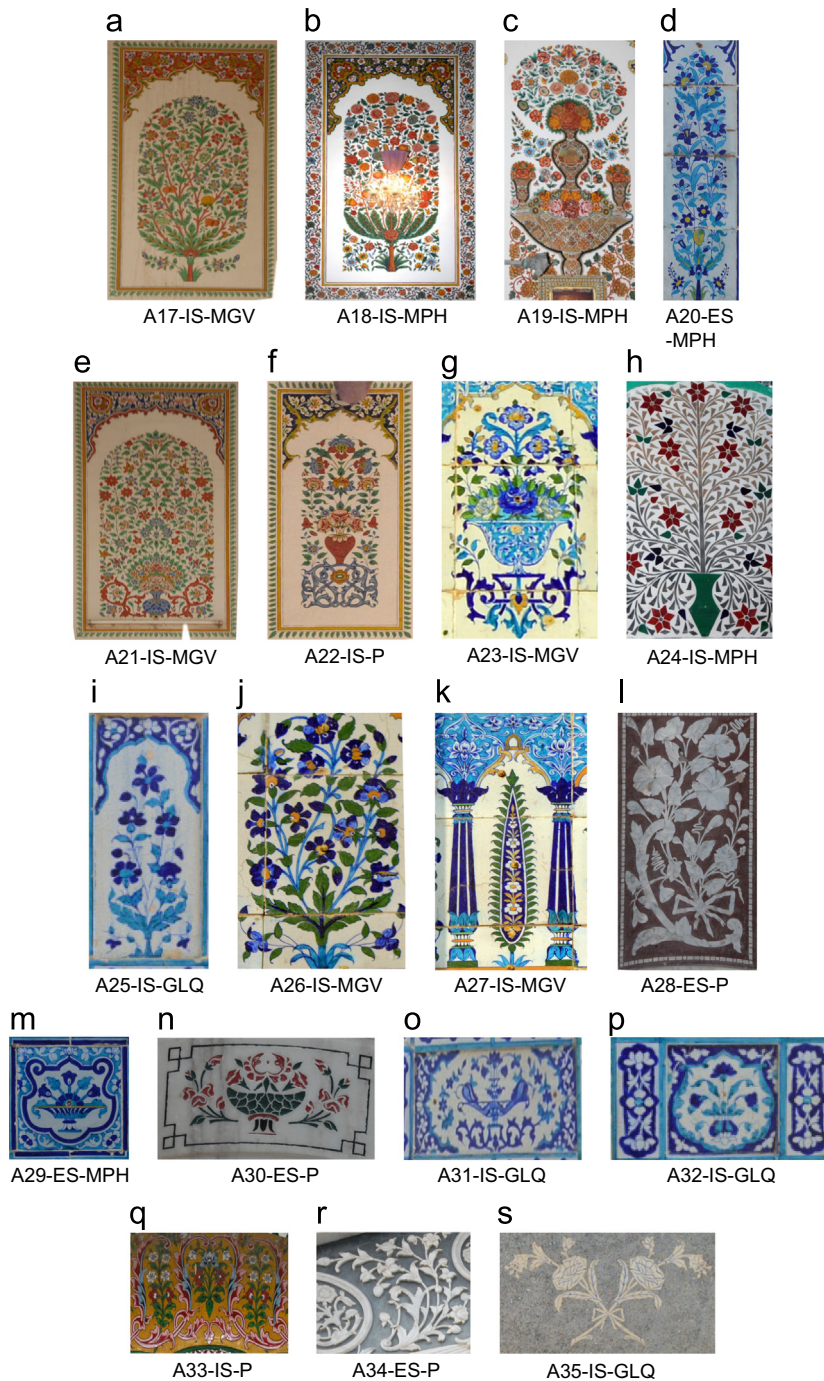


Figure 12 Tree of life and other flowering plants motifs used in Bhong Mosque (Pictures are taken by the Author).

Figure 12(e)-(h) show the motifs involving only flowers as the mode of adornment along with a vase at the base. Figure 12 (e)-(g) also show a floral composition on the upper part of the vase that acts as a space-filling element. The motif in Figure 12(k) symbolically represents a cypress tree. The remaining motifs involve flowering plants of various forms in blue, white, and red colors, as shown in Figure 12(i)-(s).

3.2.5. Category 5 - acanthus and palmette leaf patterns
Motifs resembling a leaf are shown in Figure 13. Acanthus is a plant with toothed leaves and is considered a symbol of immortality in Mediterranean countries. The patterns in

Figure 13(a), (e), (g), (h), (k), and (l) resemble acanthus, which is shown in Figure 13. Meanwhile, palmette is a decorative motif that resembles the fan shape of the leaf of a palm tree, as shown in Figure 13(b), (c), and (f). A modified form of palmette is known as flame palmette because the ends of its leaves turn inward, as shown in Figure 13(i).

3.2.6. Category 6 - rotational and translational symmetric patterns

Symmetry is one of the most important aspects of Islamic patterns. Symmetry reflects balance, proprieties, and

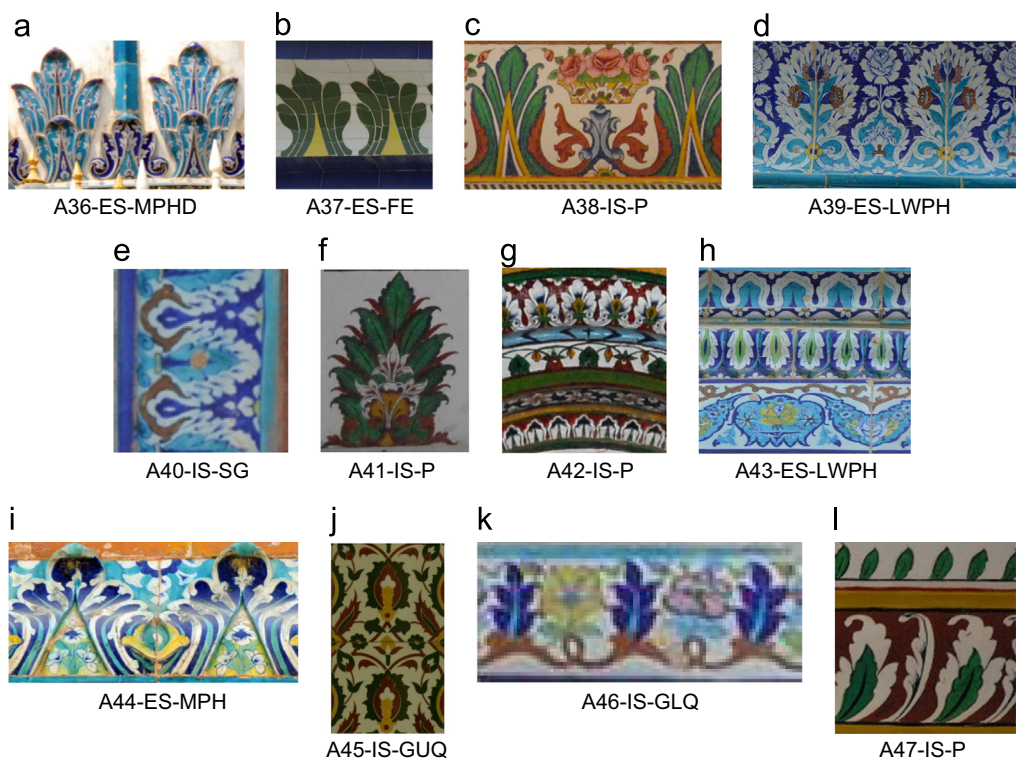


Figure 13 Different forms of acanthus and palmette leaf motifs used in Bhong Mosque (Pictures are taken by the Author).

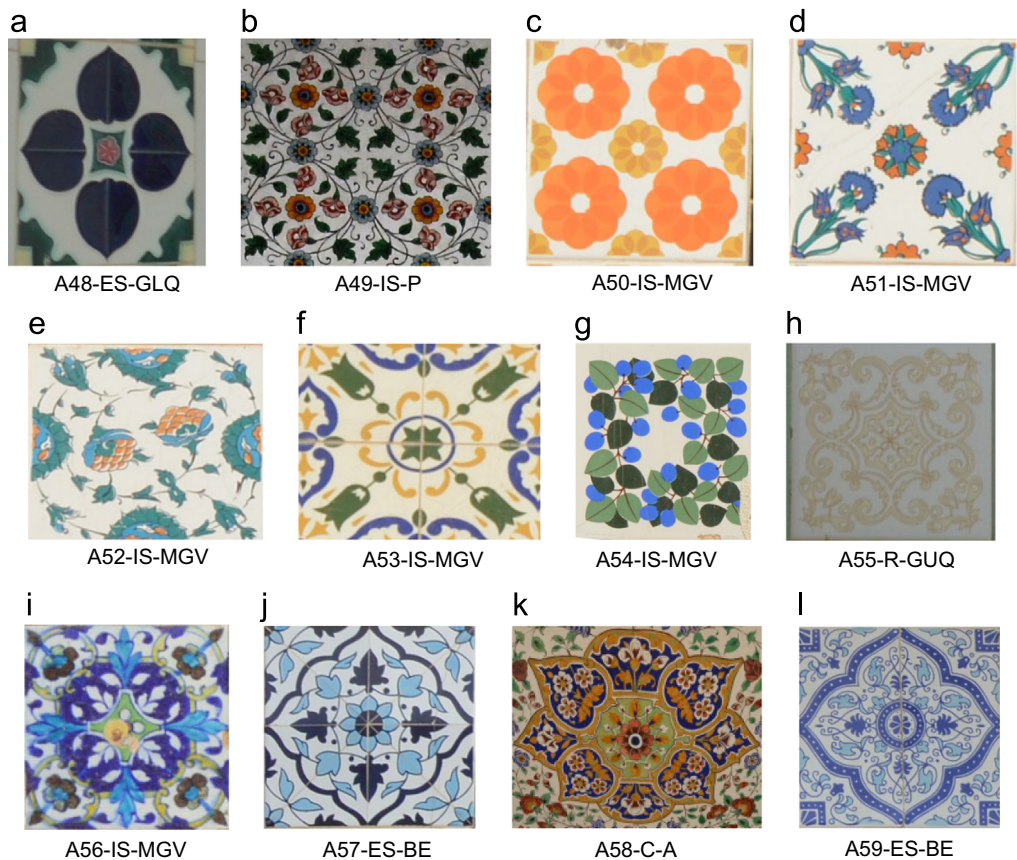


Figure 14 Different forms of rotational symmetric patterns used in Bhong Mosque (Pictures are taken by the Author).

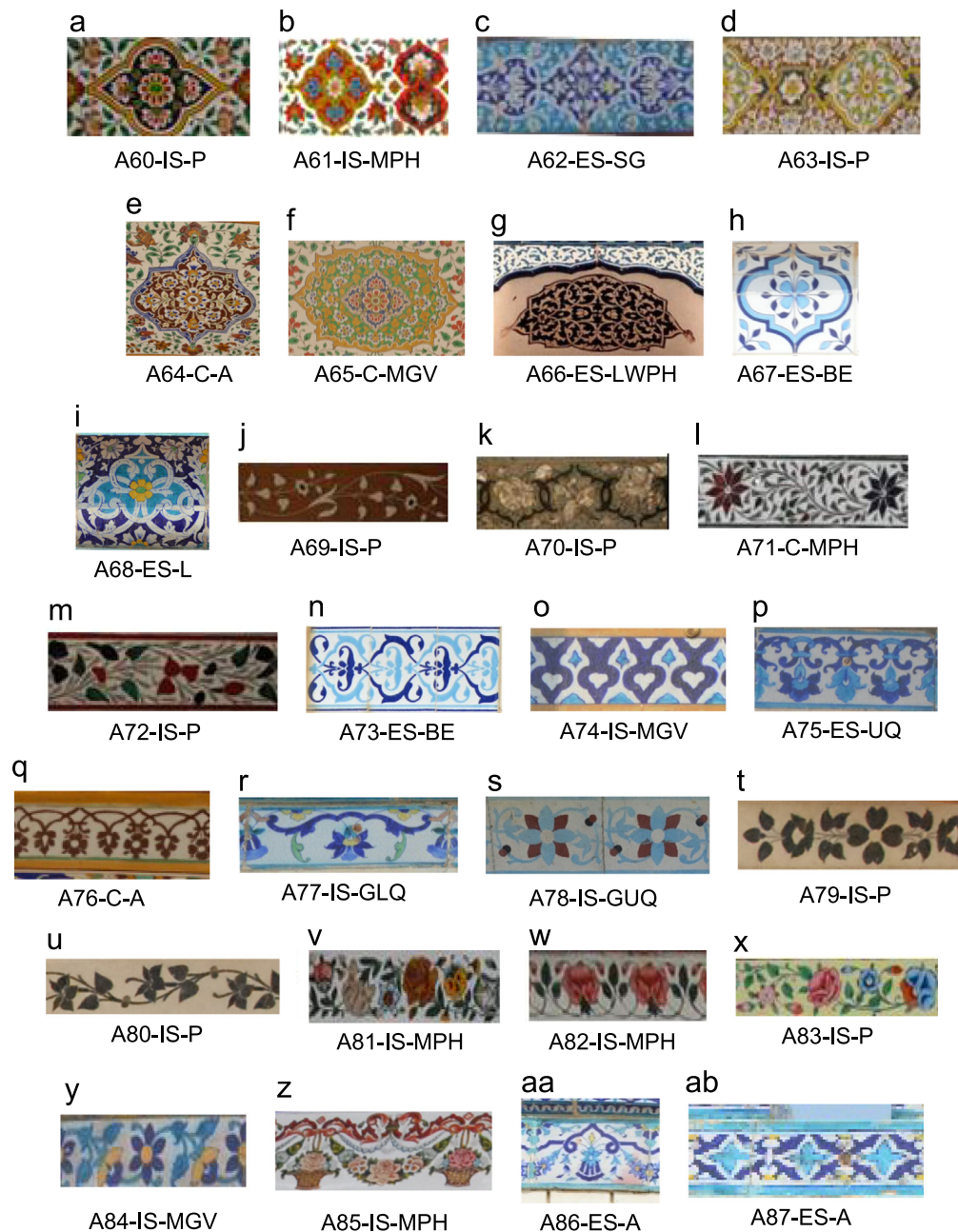


Figure 15 Translational symmetric patterns used in Bhong Mosque (Pictures are taken by the Author).

harmony in various designs. Rotation is one of the various methods through which symmetry can be achieved. Other methods include translation and glide reflection, as discussed by Nahhas (2014). Various patterns show rotational symmetry at the center, and one of these is shown in Figure 14(a) in which a leaf is rotated at 90° around a square. The style in Figure 14(d) shows that the branches are whirled around a flower at its center. Similarly, four flowers surround a small flower at the center in Figure 14 (e), whereas four flowers are pointed toward the center in Figure 14(f). The same rotational movement around a center point can be observed in all other motifs, as shown in Figure 14.

A few motifs with translational symmetry as the particular motif were repeated in a linear manner and used for the borders and other ornamentations of the mosque. Several of them have a broad border design, as shown in Figure 15(a)-(d). Similarly, patterns are continuously repeated in a linear manner on the external sides of BE and L, as shown in Figure 15(h) and (i), respectively. Patterns used for broad borders were also observed in various locations, such as the ablution area at the back, ceiling of the MGV structure, and external side of LWPH, as shown in Figure 15(e)-(g), respectively. The remaining borders are linear continuous band forms that are much shorter in width compared with the broad bands; they were applied in various locations as borders for designs, as shown in Figure 15(j)-(ab).

4. Conclusions

This research was conducted to increase the awareness and understanding of the patterns used in Bhong Mosque. Categorization and investigation of the patterns showed that craftsmen used simple geometric shapes comprising 6-, 8-, and 10-point patterns and random geometric patterns by playing with three major parameters, namely, color scheme, materials, and design, according to their placement. Only one 12-point pattern was identified, and this was applied for emphasis on the grand entrance of Bhong Mosque. The simplicity of the construction of these patterns allowed laymen to easily and accurately use such ornaments on large surfaces of the mosque ranging from walls to ceilings.

Arabesque was categorized according to the design of floral themes and the principles of symmetry. Arabesque was categorized into six patterns: spandrel, *Kingarah* and *Madakhil*, *Kerii*, tree of life, acanthus and palmette leaf, and rotational and translational symmetry. Most of the scrolling vines at the spandrels belonged to the first category. The decorative patterns used on the domes and at the topmost part of vertical elements were categorized as *Kingarah* and *Madakhil*, which are local terminologies used for such patterns. Droplet shapes, which were used in various places, were categorized as locally renowned *Kerii* patterns. The universal symbol of tree of life with floral themes was placed in the fourth category. It was used as wall painting to depict paradise themes. These murals display the juxtaposition of local and other regional fruits, flowers, and leaves. Patterns that resemble acanthus and palmette leaves were categorized as the fifth category. The last category involved patterns with rotational and translation symmetry.

References

- Abdullahi, Y., Embi, M.R.B., 2013. Evolution of Islamic geometric patterns. *Front. Archit. Res.* 2, 243-251.
- Ajorloo, B., Takavar, H., 2014. On the origin and meaning of the tree of life in the art of Iranian Bronze age. *Int. Res. J. Appl. Basic Sci.* 8 (1), 130-134.
- Al Faruqi, L.I., 1985. *Islam and Art*. National Hijra Council, Islamabad.
- Ansari, A., Ansari, M., Faiz, F., 2016. Kashi Kari in Wazir Khan Mosque. *Int. J. Hist. Res.* 6 (2), 1-12.
- Ardalan, N., Bakhtiar, L., 1973. *The Sense of Unity: the Sufi Tradition in Persian Architecture*. University of Chicago Press, Chicago.
- Bakhsh, U.R., 1970. *Traditional Architecture Design Manual M/S Ustad Rahim Bukhsh of Multan 1970s*.
- Begley, W.E., 1979. The myth of the Taj Mahal and a new theory of its symbolic meaning. *Art. Bull.* 61, 7-37.
- Blair, S., Bloom, J.M., 1995. *The Art and Architecture of Islam 1250-1800*. Yale University Press, London.
- Burckhardt, T., 2009. *Art of Islam: Language and Meaning*. World Wisdom, Inc, China.
- Critchlow, K., 1976. *Islamic Patterns*. Thames and Hudson, London.
- Dabbour, L.M., 2012. Geometric proportions: the underlying structure of design process for Islamic geometric patterns. *Front. Archit. Res.* 1, 380-391.
- El Ouaazizi, A., Nasri, A., Benslimane, R., 2015. A rotation symmetry group detection technique for the characterization of Islamic Rosette patterns. *Pattern Recognit. Lett.* 68, 111-117.
- Gulzar, S., Wörle, M., Burg, J.-P., Chaudhry, M.N., Joseph, E., Reusser, E., 2013. Characterization of 17th century Mughal tile glazes from Shahdara complex, Lahore-Pakistan. *J. Cult. Herit.* 14, 174-179.
- Guralp, A., 1970. The Sultan Ahmet Mosque restoration works between 1988-1990. *WIT Trans. Built Environ.* 42.
- Nahhas, S., 2014. *Modern Islamic Motif Design: Developing New Arabesque Motifs by Mixing Styles*. Rochester Institute of Technology, New York.
- Othman, R., Zainal-Abidin, Z.J., 2011. The importance of Islamic art in Mosque interior. *Procedia Eng.* 20, 105-109.
- Report, B.M., 1982. Project brief by Aga Khan development network.
- Saif-ur-Rehman, Manuscript of Saif-ur-Rehman, Centre for Traditional Art and Culture, Lahore., Hast-o-Neest.
- Shah, I., 1999. The Mahabat Khan mosque: a comparative study. *J. Pak. Hist. Soc.* 47, 97.
- Yüceer, H., İpekoğlu, B., 2012. An architectural assessment method for new exterior additions to historic buildings. *J. Cult. Herit.* 13, 419-425.