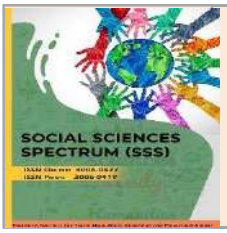

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Geometrical Analysis of Tomb of Shah Rukh-ne-Alam Multan

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Abstract

In this paper analysis of Tomb Architecture in South Punjab Area will highlight the importance of interaction of regular geometric shapes used in symmetrical way in Tomb of Shah Rukhne Alam Multan. The complex geometry has identified in design layouts and level plans of Tomb Architecture points to potential use of octagonal system. The tomb has octagonal shape which is derived from **Gazzi Ilahi** consists of intersections of many squares. As the geometrical patterns are the main essence of the tomb architecture. This research illustrates that how this multilevel largest brick and mud dome structure stands out without using concrete in it.

Keywords: Geometrical Analysis, Shah Rukh-ne-Alam, Multan, Architecture, South Punjab.

1. Introduction

1.1. Context of Funerary Architecture in Islam

Funerary monuments hold a distinctive position in Islamic architectural traditions. Unlike mosques, which are communal spaces of worship, or madrasas, which are centers of education, tombs and shrines function at the intersection of memory, spirituality, and community. They are not only cemetery but also serve as sacred spaces for *ziyarat* and social gatherings. The mausoleum is thus both a **sacred architectural type** and a **cultural institution**, often reflecting the theological, artistic, and political currents of its time.

Figure 01: *The Tomb of Shah RukneAlam Multan (Source: ZainShahid-Author Wikipedia)*

The architectural vocabulary of funerary monuments draws heavily on geometry, proportion, and symbolism. These monuments have features such as octagons, squares, and domes which are not only the decorative elements; they are actually the **metaphysical symbols** of soul's journey, eternity of the divine order, and interventions of the saints (Nasr, 1987; Grabar, 1983). This tomb is a symbolic representation, source of good knowledge about Islamic architecture and its connection with spiritual philosophy.

1.2. The Case of Shah Rukn-e-Alam's Tomb

The Tomb of Shah Rukn-e-Alam which is located in Multan, Pakistan (built ca. 1320–1324 CE, consecrated 1335 CE), is one of the most primitive monumental scale Islamic mausoleums in South Asia.

The tomb is dedicated to a renowned Sufi saint from Suhrawardi order, which signifies the blend of **Sufi spiritual symbolism** and **Tughluq imperial architecture**. The tomb is basically constructed with brick and it is ornamented with striking blue glazed tiles. It has octagonal shape and an enormous dome which symbolize the values of sacred geometry and proportion.

The architecture of this tomb became a set pattern for the other mausoleums which were built later in the subcontinent, such as Humayun's Tomb in Delhi and the Taj Mahal in Agra (Golombek, 1981; Asher, 1992). Also, the glazed tile ornamentation on the tomb reflects the local traditional craft of Multan that distinguish the city as a hub of glazed tile production.

1.3. Multan: The City of Saints

Multan's epithet as the "City of Saints" is not accidental. By the 13th and 14th centuries, it had become one of the principal centers of Sufism in South Asia, particularly through the influence of the Suhrawardi order. The Suhrawardis established **khanqahs** (lodges) and **shrines** that provided spiritual guidance, social services, and political mediation (Gilmartin, 1979). Shrines like those of Bahauddin Zakariya and Shah Rukn-e-Alam became magnets for pilgrims across the subcontinent.

In this context, the tomb of Shah Rukn-e-Alam is not only an architectural artifact but also a **living institution**. It continues to attract thousands of devotees annually, especially during the saint's *urs* (death anniversary), where rituals, recitation, and communal meals reinforce its social and spiritual relevance (Eaton, 2019).

1.4. Research Significance

Studying the geometry of Shah Rukn-e-Alam's tomb is significant for multiple reasons:

1. **Architectural Heritage**: As one of the earliest examples of large-scale domed mausoleums in South Asia, the shrine represents a key transitional form between Central Asian prototypes and Mughal refinements.
2. **Sacred Geometry**: Its reliance on octagons, rotated squares, and circles demonstrates the metaphysical principles that underpinned Islamic architectural design.
3. **Cultural Identity**: The shrine is central to Multan's cultural memory and continues to function as a symbol of spiritual authority.
4. **Conservation**: With ongoing challenges of urbanization, pollution, and restoration, a

detailed geometric and symbolic study provides valuable insight for heritage preservation strategies.

1.5. Research Aims and Questions

This study aims to conduct a comprehensive architectural and geometric analysis of Shah Rukn-e-Alam's tomb using **field surveys, AutoCAD-based reconstructions, and comparative analysis**. The central research questions are:

- What geometric principles govern the design of the tomb's plan, dome, and buttresses?
- How do these geometric systems reflect Sufi metaphysics and Islamic cosmology?
- In what ways does the shrine anticipate or differ from later Mughal mausoleums?
- How can understanding its geometry contribute to modern conservation practices?

1.6. Scope and Limitations

The scope of this research is confined to the **geometric, architectural, and symbolic dimensions** of the shrine. While the study acknowledges broader socio-political contexts, its focus is on measurable design principles. The analysis is based primarily on field measurements, historical scholarship, and digital reconstructions. Limitations include restricted access to some interior areas, reliance on secondary sources for certain historical claims, and the absence of 3D laser scanning due to logistical constraints.

1.7. Contribution of the Study

This paper contributes to the growing field of Islamic architectural studies by:

- Providing one of the first detailed AutoCAD-based reconstructions of Shah Rukn-e-Alam's geometry.
- Highlighting the shrine's role as a **prototype** in the evolution of South Asian mausoleums.
- Interpreting its geometric design through the lens of **Sufi cosmology and symbolism**.
- Offering insights into how traditional geometry can inform contemporary heritage conservation.

1.8. Structure of the Paper

The paper is organized as follows:

- **Section 2** provides the historical background of the shrine and its patronage.
- **Section 3** reviews existing literature on Islamic geometry, funerary architecture, and Multan's cultural context.
- **Section 4** outlines the methodology, including fieldwork and AutoCAD analysis.
- **Section 5** presents the architectural and geometric analysis of the tomb.
- **Section 6** examines ornamentation and materiality.
- **Section 7** interprets cultural and symbolic meanings.
- **Section 8** offers a comparative study with other mausoleums.
- **Sections 9 and 10** provide discussion and conclusion

2. Historical Background

2.1. The Tughluq Dynasty and Its Architectural Legacy

The tomb of Shah Rukn-e-Alam was constructed during the early years of the **Tughluq dynasty (1320–1414 CE)**, which emerged after the decline of the Khalji dynasty in Delhi. Founded by **Ghiyath al-Din Tughluq (r. 1320–1325)**, the dynasty is remembered for its austere, massive architectural style that reflected the political climate of the time.

The Tughluqs ruled during a period of frequent military campaigns, shifting capitals, and complex negotiations between imperial authority and regional powers. Their architecture often mirrored these realities: **sloping battered walls**, the extensive use of stone and brick, and monumental proportions characterized their constructions. While many Tughluq monuments were defensive in nature — such as forts, citadels, and walls — the tomb of Shah Rukn-e-Alam stands out as a strikingly spiritual and symbolic structure, adapted from a building originally intended for Ghiyath al-Din himself (Asher, 1992).

The decision to dedicate the unfinished tomb to Shah Rukn-e-Alam reveals the **intertwining of imperial politics and Sufi sanctity**. By associating themselves with revered saints, rulers sought legitimacy among local populations. In this case, the Tughluqs demonstrated their piety and secured loyalty in the strategically important region of Multan.

2.2. Multan: The "City of Saints"

Multan's reputation as the **"Madinat al-Awliya" (City of Saints)** was firmly established by the 13th century. Its location on trade routes connecting Central Asia, Persia, and India made it not only a commercial hub but also a melting pot of cultural and spiritual influences.

The arrival of the **Suhrawardi order of Sufis**, particularly through the figure of **Sheikh Bahauddin Zakariya (1171–1262)**, transformed the city into a center of Islamic learning and spirituality (Gilmartin, 1979). His grandson, **Shah Rukn-e-Alam (1251–1335)**, carried forward this legacy, attracting disciples, scholars, and rulers to his khanqah.

By the time of his death in 1335, Shah Rukn-e-Alam was recognized not only as a spiritual guide but also as a mediator between rulers and the people. His burial in such a monumental tomb reflects both his religious stature and the deep reverence the community held for him.

2.3. The Suhrawardi Sufi Order

The **Suhrawardiyya order**, originating in Baghdad with Sheikh Shihab al-Din Suhrawardi, emphasized balance between **spiritual practice and engagement with society**. Unlike some other Sufi traditions that leaned toward ascetic withdrawal, the Suhrawardis actively interacted with political authorities while guiding communities in matters of faith and social welfare.

Shah Rukn-e-Alam embodied this ethos. His khanqah in Multan became a hub of spiritual instruction, charity, and education. The tomb thus symbolizes more than his personal legacy; it reflects the **role of Sufi shrines as community institutions**. These shrines offered food, mediation, and spiritual refuge, reinforcing the notion of the saint as both a **spiritual intercessor** and a **social leader**.

The choice to house his remains in a monumental tomb originally associated with imperial architecture reinforces the blurred lines between political authority and Sufi sanctity in

medieval South Asia (Trimingham, 1971).

2.4. Architectural Influences: Central Asia, Persia, and Local Traditions

The design of Shah Rukn-e-Alam's tomb reveals a synthesis of **multiple architectural traditions**:

1. **Central Asian Influences**: The octagonal plan and double-tiered design echo Timurid and pre-Timurid prototypes in Transoxiana, such as the *Gur-e-Amir* in Samarkand. The use of massive domes on elevated drums was a hallmark of Central Asian funerary architecture (Golombek & Wilber, 1988).
2. **Persian Influences**: The reliance on brick construction and decorative glazed tilework reflects Persian precedents. The symbolic use of turquoise and cobalt glazes draws from Seljuk and Ilkhanid traditions (Necipoğlu, 1995).
3. **Local Traditions**: The use of baked brick, the skill of Kashigar tile artisans, and the adaptation to Multan's climate reveal how the monument is rooted in Punjab's vernacular building culture. The thick sloping walls are not only stylistic but also functional, designed to withstand seismic earthquakes and life threating trytweather conditions.

This **hybrid character** makes the tomb a transitional monument, predicting the refined elegance of Mughal architecture while preserving regional distinctiveness.

2.5. The Role of the Dome and Monumentality

The tomb's crowning feature is its **hemispherical dome**, one of the earliest large-scale domes in South Asia. The tomb dominates the Multan's skyline (with 15 meters' diameter) by highlighting it verticality in such a way that indicates both the **imperial grandeur** and **cosmic symbolism**

As the tomb have single central dome, rather than multiple domes or just flat roofs, which reflects the shift in architectural design priorities, which are **symbolic visibility, grandeur** and **monumentality.** The tomb emphasizes its political and spiritual authority due to its position at the top of Multan fort, which make it visible from far away.

2.6. The Tomb's Place in Regional History

The tomb not only attracts attention as Multan's identity but also it shaped the architectural development. For centuries, rulers patronized the shrine, recognizing the saint's permanent influence. The Mughal emperors like Akbar and Jahangir also recognized the spiritual value of the Multan's shrines, and they also integrated them in their stately religious politics (Eaton, 2019). The role of shrine was not limited just an architectural masterpiece — it helped to bring the communities together by binding them through festivals, oral traditions and ceremonies by becoming the **repository of cultural memory.** The devotees from across the South Asia continues to attend its *Urs* which shows it as a significant social and religious institution.

2.7. Restoration and Conservation

Due to exposure and earthquakes, with the passage of time, the tomb faced natural decays & deterioration. With the technical assistance of the UNESCO, **the Auqaf department of Pakistan** started the most **restoration works in 1970s**. this restoration process involved consolidation of its dome, restoration & repairing of glazed blue tiles and reconstruction of damaged part of the tomb.

While the restoration of the tomb successfully happened to revitalize the traditional craftsmanship, debates started regarding the authenticity and creating balance between preservation and reconstruction. The argument occurred from few scholars that restoration works removing the traces of the material history, but some scholars supported these restoration works which are essential for the spiritual function of the shrine.

Today, the tomb is in the **UNESCO's Tentative List for World Heritage Sites** (UNESCO, 2023), which highlights its global value as a cultural monument. But the conservation challenges and difficulties are still there, like air pollution, mass cultural tourism and urban encroachment.

2.8. Summary

The historical context of Shah Rukn-e-Alam's tomb discloses this shrine as a **multi-faceted monument**:

- An artefact of **Tughluq majestic patronage**,
- A **symbol of Suhrawardi Sufi authority**,
- A **hybrid architectural synthesis** of Central Asian, Persian, and local traditions,
- And a **living institution** continually reshaped through restoration and cultural practice.

Its strength across centuries highlights the way architecture in the Islamic tradition functions simultaneously as **sacred space, social hub, and cultural symbol**.

3. Literature Review

3.1. Geometry and Symbolism in Islamic Architecture

Geometry is widely recognized as one of the most defining and unifying features of Islamic architecture. Scholars argue that geometric patterns, beyond their decorative appeal, function as a **visual theology** of Islam. Critchlow (1976) describes geometry as the "language of the universe," where the repetition and interlocking of forms reflect the infinite nature of God. Nasr (1987) likewise emphasizes that geometric symbolism conveys the Qur'anic principle of divine unity (*tawḥīd*) through spatial and visual order.

The **circle** is regarded as the most fundamental form, symbolizing infinity, eternity, and divine perfection (Burckhardt, 1976). The **square** represents material existence, stability, and the created world, while the **octagon** functions as a transitional figure, mediating between the square and the circle. In architectural terms, this symbolism is manifested in the widespread use of octagonal bases for domes — a feature clearly visible in Shah Rukn-e-Alam's tomb.

Grabar (1983) argues that geometry in Islamic architecture was not merely symbolic but also practical, enabling builders to create monumental structures without reliance on written blueprints. Geometry allowed for modular repetition, scalability, and harmony in proportion. This dual role, both metaphysical and functional, underscores its centrality in Islamic building traditions.

3.2. Manuals of Design and the Science of Geometry

Knowledge of geometry was transmitted through both oral tradition and written treatises. Necipoğlu (1995), in her seminal study *The Topkapi Scroll*, documents how architectural drawings preserved in Ottoman archives reveal complex geometric systems guiding design. These manuals demonstrate how builders derived proportions from simple operations on the

square and circle, ensuring that every architectural element corresponded to cosmic principles.

The **practical geometry** used by artisans often relied on instruments such as compasses and straightedges, allowing craftsmen to generate highly sophisticated patterns with remarkable accuracy (Bonner, 2003). This system democratized design knowledge: even without literacy, masons and artisans could construct buildings that embodied profound metaphysical symbolism.

In South Asia, the diffusion of these traditions likely occurred through Persian and Central Asian networks, where migrating artisans brought both their craft and cosmological frameworks. Shah Rukn-e-Alam's tomb, with its systematic progression from square to octagon to dome, demonstrates how these ideas were assimilated and localized.

3.3. Islamic Funerary Architecture: Comparative Traditions

Funerary architecture in the Islamic world varied widely across regions, but certain patterns recur. Blair and Bloom (2003) argue that mausoleums functioned both as memorials and as active pilgrimage sites, often serving dynastic and spiritual purposes simultaneously.

- **Central Asia and Persia**: Structures like the *Samanid Mausoleum* (10th century, Bukhara) and the *Gur-e-Amir* (1404, Samarkand) exemplify the Central Asian tradition of octagonal and domed mausoleums. These influenced later monuments in India, including Shah Rukn-e-Alam's shrine (Golombek & Wilber, 1988).
- **The Ilkhanid Period**: Mausoleums such as the *Tomb of Oljeitu* at Sultaniyya (1302–1312) showcased the use of massive domes and glazed ornamentation, features echoed in Multan.
- **The Indian Subcontinent**: Pre-Mughal mausoleums, like that of Bahauddin Zakariya (d. 1262), established a precedent for monumental Sufi shrines in South Asia (Edwards, 1990). Shah Rukn-e-Alam's tomb surpassed these earlier efforts in scale and geometric sophistication, paving the way for Mughal tomb architecture.

The symbolic resonance of these tombs was profound. Grabar (1983) suggests that the domed mausoleum symbolized paradise, providing a tangible reminder of the saint's intercession between God and the community.

3.4. Sufism, Shrines, and the Sacred Landscape of South Asia

Sufi shrines in South Asia played multifaceted roles as spiritual centers, social institutions, and cultural landmarks. Trimingham (1971) highlights how Sufi orders, such as the **Suhrawardiyya**, combined mystical practice with community engagement, ensuring that their shrines became focal points of daily life.

Gilmartin (1979) demonstrates that shrines in Multan, including that of Shah Rukn-e-Alam, acted as **mediating institutions**, providing charity, arbitration, and legitimacy to rulers. Eaton (2019) further notes that shrines were deeply embedded in the Persianate cultural world, linking South Asia to broader Islamic traditions of saint veneration.

Multan, as the "City of Saints," hosted numerous shrines that shaped its urban identity. Shah Rukn-e-Alam's tomb became the city's most iconic monument, symbolizing both its spiritual authority and its cultural distinctiveness.

3.5. Ornamentation, Calligraphy, and Tile Traditions

The ornamentation of Islamic shrines is never merely decorative but deeply symbolic. Allen

(1986) emphasizes that ornamentation functioned as an extension of geometry, embedding divine order into every surface. Necipoğlu (1995) supports this view, arguing that ornamental programs mirrored cosmological principles.

In Multan, the tradition of **kashi-kari** (glazed tilework) reached its height during the 14th and 15th centuries. The tomb of Shah Rukn-e-Alam exemplifies this craft, employing a palette of turquoise, cobalt blue, and white. According to Munshi (2019), these colors carry layered symbolism:

- **Blue** → spirituality, divine knowledge.
- **White** → purity, peace.
- **Green** → paradise and mercy.

The decorative bands of calligraphy further reinforce the spiritual significance of the monument. Qur'anic inscriptions not only beautify the shrine but also transform it into a **textual space**, where the Word of God is inscribed into the very fabric of architecture (Michell, 1995).

3.6. Conservation and Digital Heritage Studies

Conservation of Islamic monuments, particularly shrines, has become a major concern in modern scholarship. UNESCO (2023) has listed the tomb of Shah Rukn-e-Alam on its tentative list for World Heritage recognition, highlighting its architectural and cultural significance.

Restoration campaigns, especially those carried out in the 1970s by the Auqaf Department of Pakistan, revived traditional tile-making techniques. However, these efforts raised debates over **authenticity versus reconstruction** (Flood, 2009).

Digital heritage methods have emerged as powerful tools for documentation and conservation. Stylianidis and Remondino (2016) emphasize the role of photogrammetry, 3D scanning, and BIM in capturing accurate data for heritage sites. AutoCAD modeling, as used in this study, contributes to this growing field, offering precise reconstructions that reveal the underlying geometry of monuments.

3.7. Identified Research Gaps

While scholarship on Islamic architecture, funerary traditions, and Sufi shrines is extensive, several gaps remain with respect to Shah Rukn-e-Alam's tomb:

1. **Geometric Reconstruction**: Few studies have systematically analyzed its geometry using modern digital tools like AutoCAD.
2. **Comparative Analysis**: The shrine is often mentioned as a precursor to Mughal architecture, but detailed comparative studies remain limited.
3. **Symbolic Interpretation**: Color symbolism and ornamentation have been described, yet the incorporation of geometry, cosmology, and Sufi philosophy requires deeper analysis.
4. **Conservation Approaches**: Current debates on heritage preservation rarely consider the geometric and symbolic magnitudes of shrines, focusing instead on material conservation.

This study addresses these gaps by conducting a detailed **AutoCAD-based geometric analysis**, situating the shrine within broader traditions of Islamic geometry, and understanding its symbolism in light of Sufi cosmology.

4. Research Methodology

4.1. Research Approach

This study discussed a **mixed-method research design**, integrating historical analysis, field survey, and digital reconstruction. The approach combined **qualitative methods** — archival research, literature review, and symbolic interpretation — with **quantitative methods**, including precise geometric measurement and AutoCAD-based modeling. This dual strategy confirmed both cultural sensitivity and technical accuracy.

The methodology is rooted in **architectural historiography**, which emphasizes the importance of evaluating built forms as both cultural texts and material artifacts (Michell, 1995). By integration of historical scholarship with digital heritage tools, the study provides a complete framework for understanding the Tomb of Shah Rukn-e-Alam.

4.2. Field Survey and Data Collection

Fieldwork was conducted at the shrine complex in Multan, focusing on:

- **Plan dimensions**: measuring base diameter, wall thickness, and buttress placement.
- **Vertical dimensions**: recording tier heights, drum proportions, and dome radius.
- **Ornamentation sampling**: documenting tilework, inscriptions, and color palettes using high-resolution photography.
- **Site context**:observing orientation, geography (the tomb sits on Multan Fort), and visibility within the urban landscape.

Data was collected using a combination of **laser measuring devices, traditional tapes, and photographic surveys**. Restrictions on interior access required triangulation with published surveys (Golombek, 1981; Asher, 1992) to confirm measurements.

4.3. AutoCAD-Based Geometric Analysis

The core of the methodology involved reconstructing the tomb's geometry in **AutoCAD**, a computer-aided design software widely used in architectural research. This process emerged in three stages:

1. **Base Plan Reconstruction**

- A square was drawn using the measured base dimensions.
- A rotated square (45°) was inscribed within the original square to generate the **octagon**.
- Rather than ad hoc construction of shrine, the shrine has clear reliance on geometric derivations which can be perceived through its octagonal plan matching the shrine's base.

2. **Vertical Section Analysis**

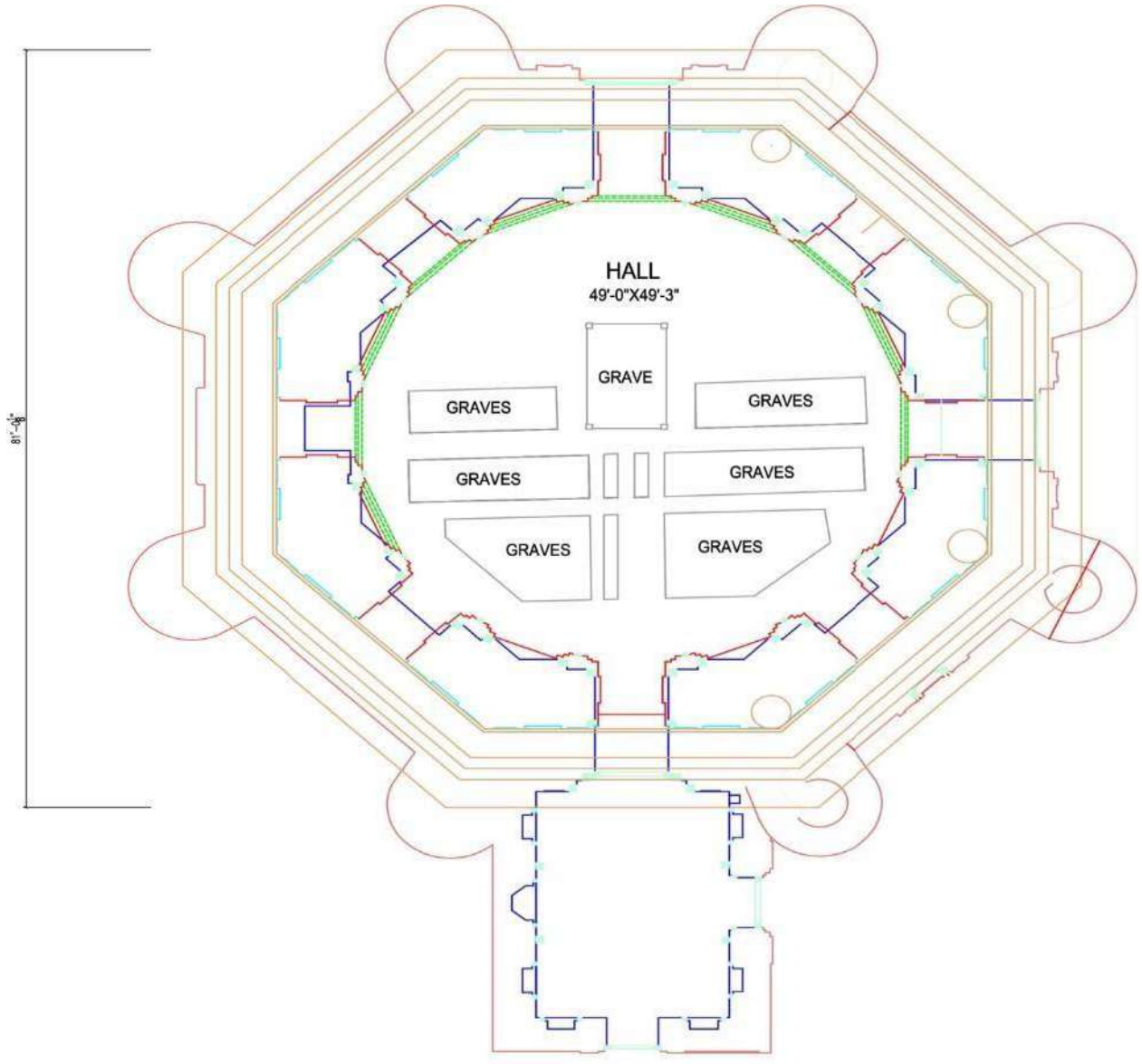
- The height of each structural tier was plotted against the base diameter.
- The dome was reconstructed using semicircular arcs, demonstrating a near **1:1 ratio among its dome height and base diameter**, a symbol of proportional congruence in Islamic funerary architecture.

3. Buttress and Ornament Integration

- The Buttresses at each edge were investigated through semi-circles and diagonals inscribed from the shrine's plan.
- The decorative bands are revealing its alignment underlying its geometric grids by super-imposing on the AutoCAD model.

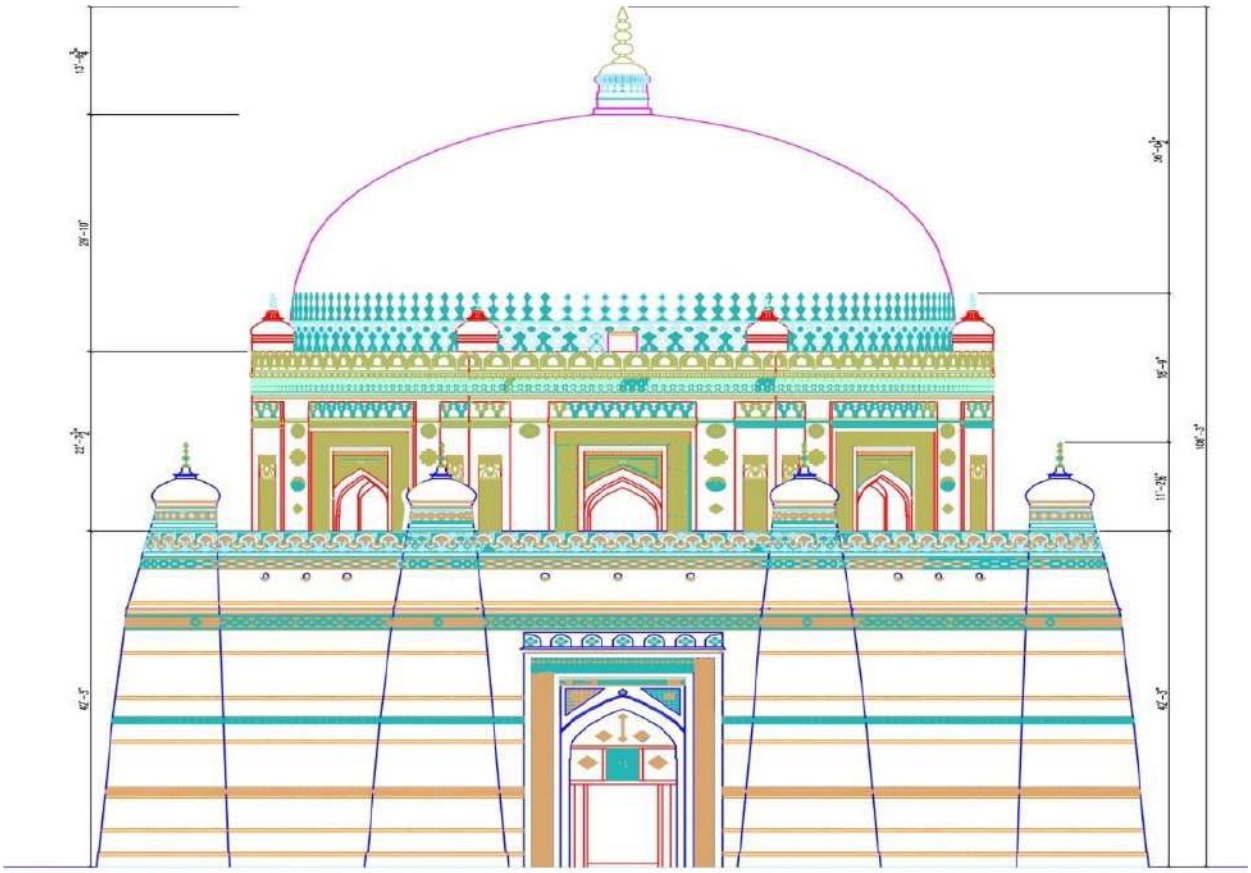
This work process demonstrated that how **geometry administered not only its structure but also its decorative ornamentation** and its every design detail reflects a symbolic meaning.

Figure 02: *Auto-CAD plan. (Source: Archeology Department, Multan.)*



Ground Floor Plan

Figure 03: *Front Elevation. (Source: Archeology Department Multan)*



Front Elevation

4.4. Comparative Framework

The AutoCAD reconstructions of Shah Rukn-e-Alam's shrine were compared to its geometric analysis to evaluates the findings like;

- The *Samanid Mausoleum* (Bukhara).
- The *Tomb of Oljeitu* (Sultaniyya).
- The *Gur-e-Amir* (Samarkand).
- The Early Mughal tombs such as *Humayun's Tomb* (Delhi).

This comparative framework allowed the study to identify connections (octagonal plans, dome ratios) and innovations (scale, ornament integration).

4.5. Digital Heritage and Documentation Standards

The purpose of using AutoCAD puts this research with in the wide-ranging trends in the digital **heritage documentation.** Researches like Stylianidis and Remondino (2016)

Stylianidis and Remondino (2016) underline that how digital techniques like AutoCAD,

photogrammetry, and 3D scanning can enhance these heritage studies by aiding accurate restoration and long-term conservation results.

While this research relied primarily on AutoCAD, it acknowledges the potential of integrating **BIM (Building Information Modeling)** and **3D laser scanning** in future projects. Such tools could provide even richer datasets, supporting conservation planning, structural analysis, and visitor interpretation.

4.6. Limitations of the Methodology

Despite its strengths, the methodology faced several limitations:

- **Restricted Access**: Interior spaces were partially inaccessible due to conservation restrictions.
- **Restoration Bias**: The 1970s UNESCO-led restoration altered certain features, complicating efforts to distinguish unique fabric from later additions.
- **2D Constraints**: AutoCAD reconstructions are inherently two-dimensional. Without full 3D scanning, volumetric accuracy (e.g., dome curvature) remains partially estimated.
- **Symbolic Interpretation**: While geometric reconstruction is precise, symbolic readings involve informative frameworks that may vary among scholars.

These limitations were mitigated by triangulating field data with published sources, consulting secondary documentation, and clearly acknowledging informative assumptions.

5. Architectural & Geometric Analysis

5.1. Overall Architectural Form

The tomb of Shah Rukn-e-Alam is composed of three main structural elements:

1. An **octagonal base** (plan geometry).
2. A **two-tiered elevation** with battered walls.
3. A **hemispherical dome** rising from a high drum.

The structure reaches a height of approximately 35 meters, making it one of the tallest pre-Mughal monuments in South Asia (Golombek, 1981). Its monumental form is accentuated by its placement atop the Multan Fort, where the shrine dominates the city skyline.

The octagonal geometry provides both **structural stability** and **symbolic resonance**. As Nasr (1987) and Critchlow (1976) argue, the octagon embodies the transition from earthly existence (square) to divine perfection (circle). Thus, the tomb physically and symbolically mediates between the terrestrial and the celestial.

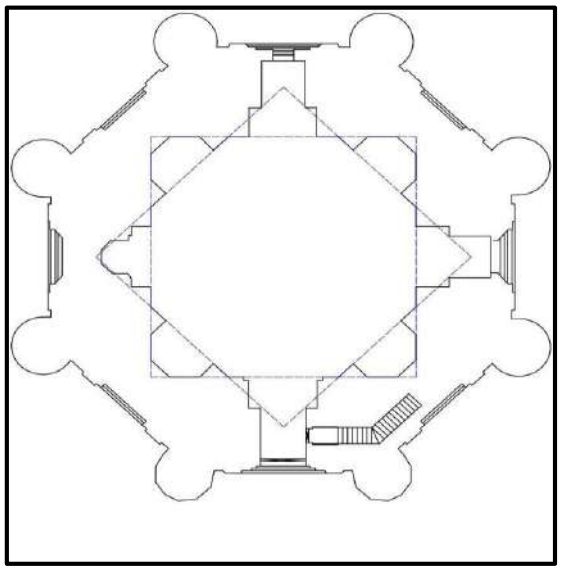
5.2. Geometric Proportions

A detailed AutoCAD analysis reveals the shrine's reliance on precise geometric proportions:

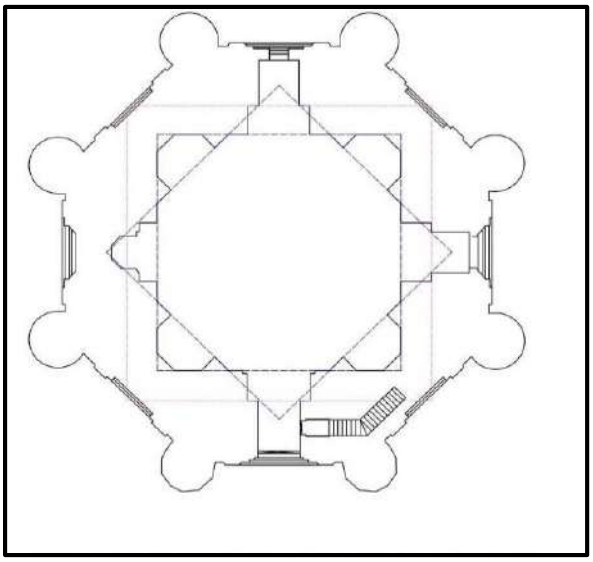
- The **base diameter** is approximately equal to the **dome height**, producing a **1:1 proportional ratio** that reflects harmonic balance.
- The **height of the lower tier** is nearly half the total height, reinforcing symmetry across vertical divisions.
- The **octagonal plan** is derived from the rotation of a square by 45°, generating eight equal sides inscribed within a circle.

- Buttresses align precisely with the diagonals of the square, demonstrating that their placement was mathematically derived rather than arbitrary.

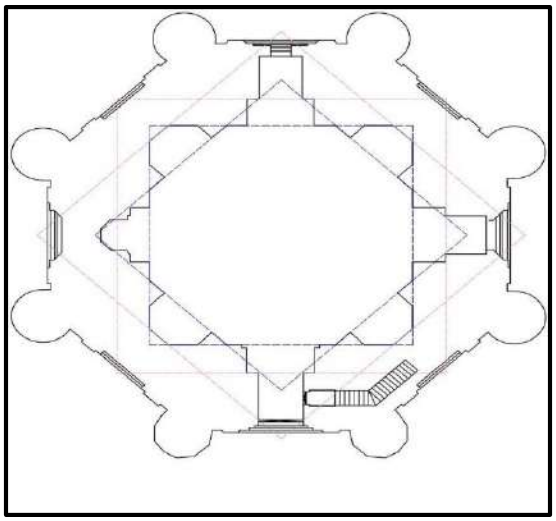
This proportional system reflects the same principles found in Persian and Central Asian mausoleums, where geometric harmony was understood as an expression of divine order (Necipoğlu, 1995).



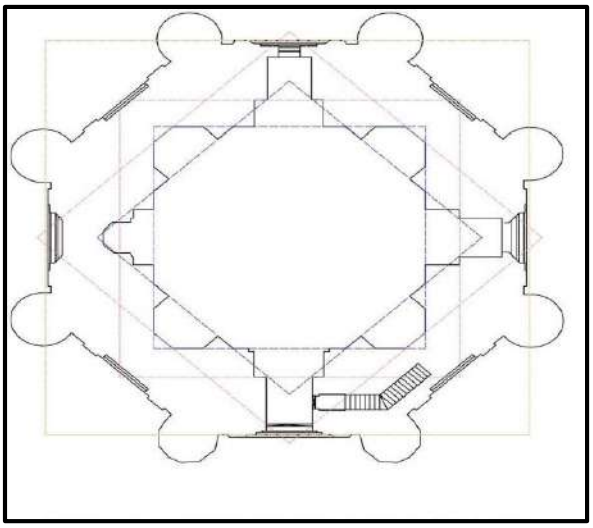
Figue 04(a) Step No.1: Draw Square Inside Tomb



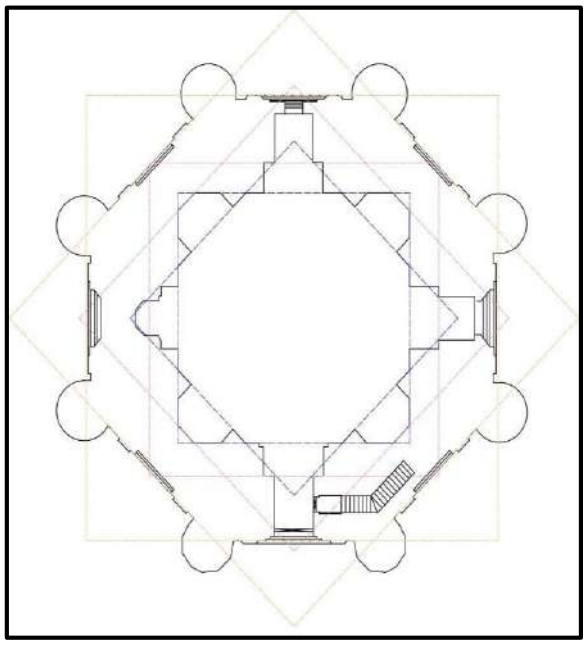
Figue 04(b) Step No.2: Draw Rotated Square



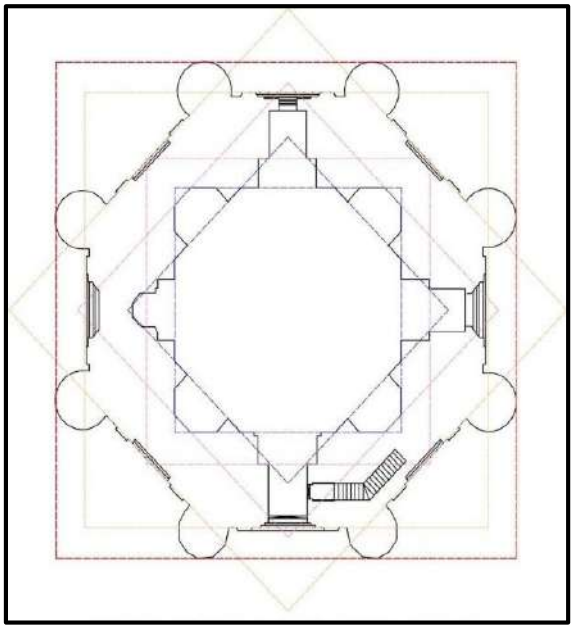
Figue 04(C) Step No.3: Draw Outer Square on 4' Off set



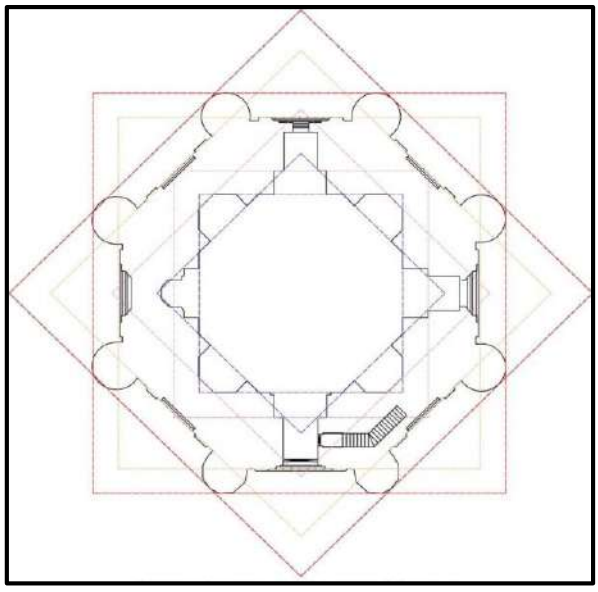
Figue 04(D) Step No. 04: - Draw Other Outer Square



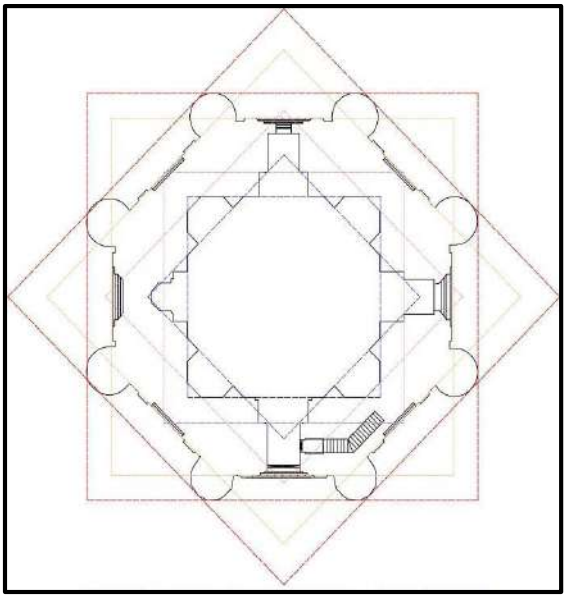
Figue 04(E) Step 05: **- Draw Rotated Square**



Figue 04(E) Step 06: **- Draw Other Outer Square**



Figue 04(F) Step 07: **Draw Rotated Square**



Figue 04(G) Step 08: **Draw All Diagonals Inside Square**

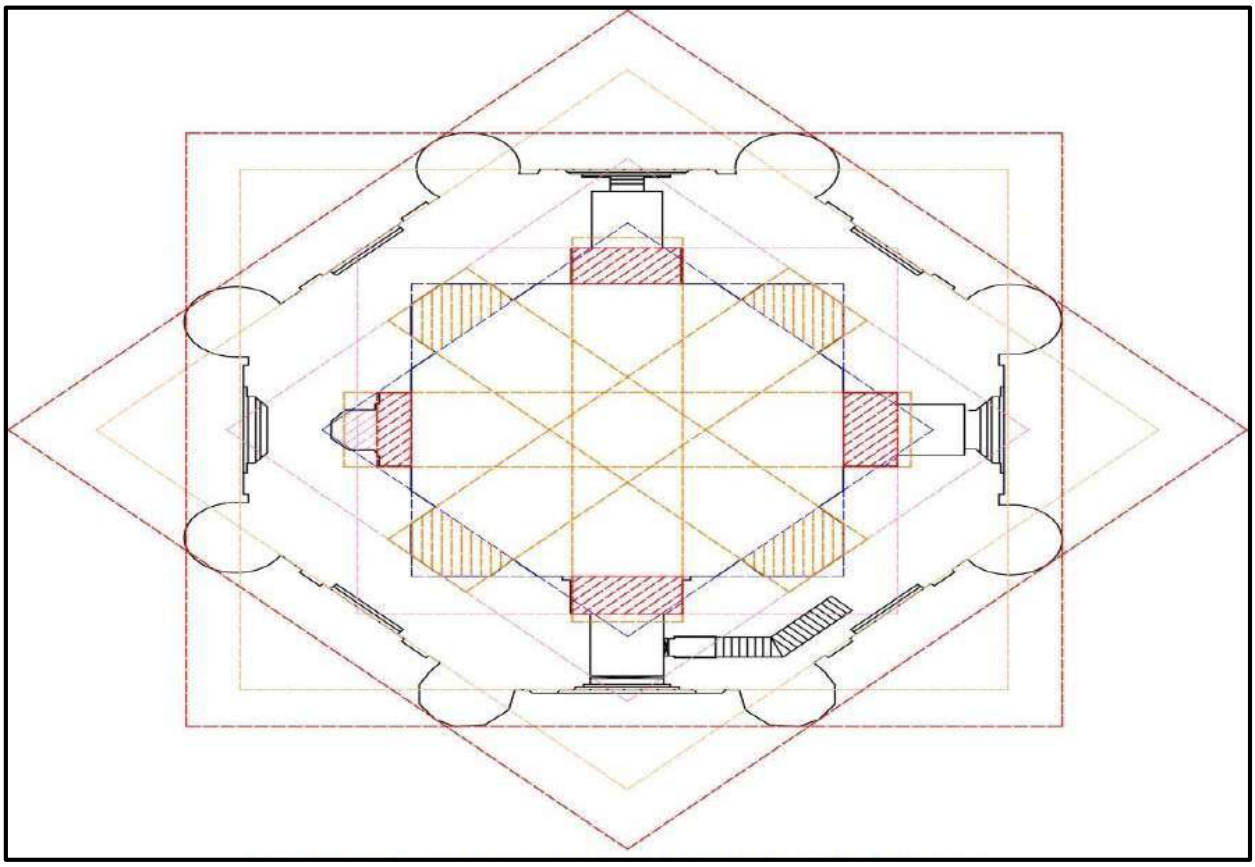


Figure 04(H) Step 09: **Draw Rectangles on All Diagonals Inside Square.**

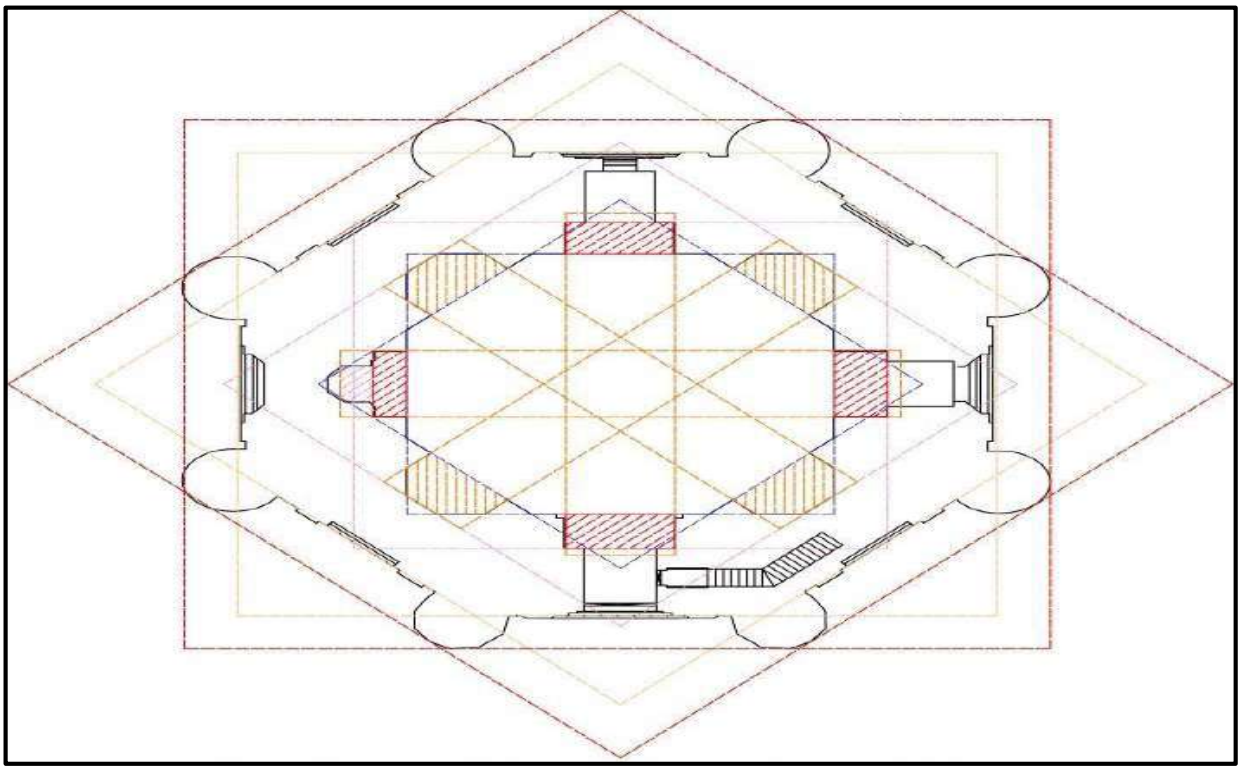


Figure 04(I) Step 10: **- Hatch All Corners Made By Intersection of Diagonals and Rectangles**

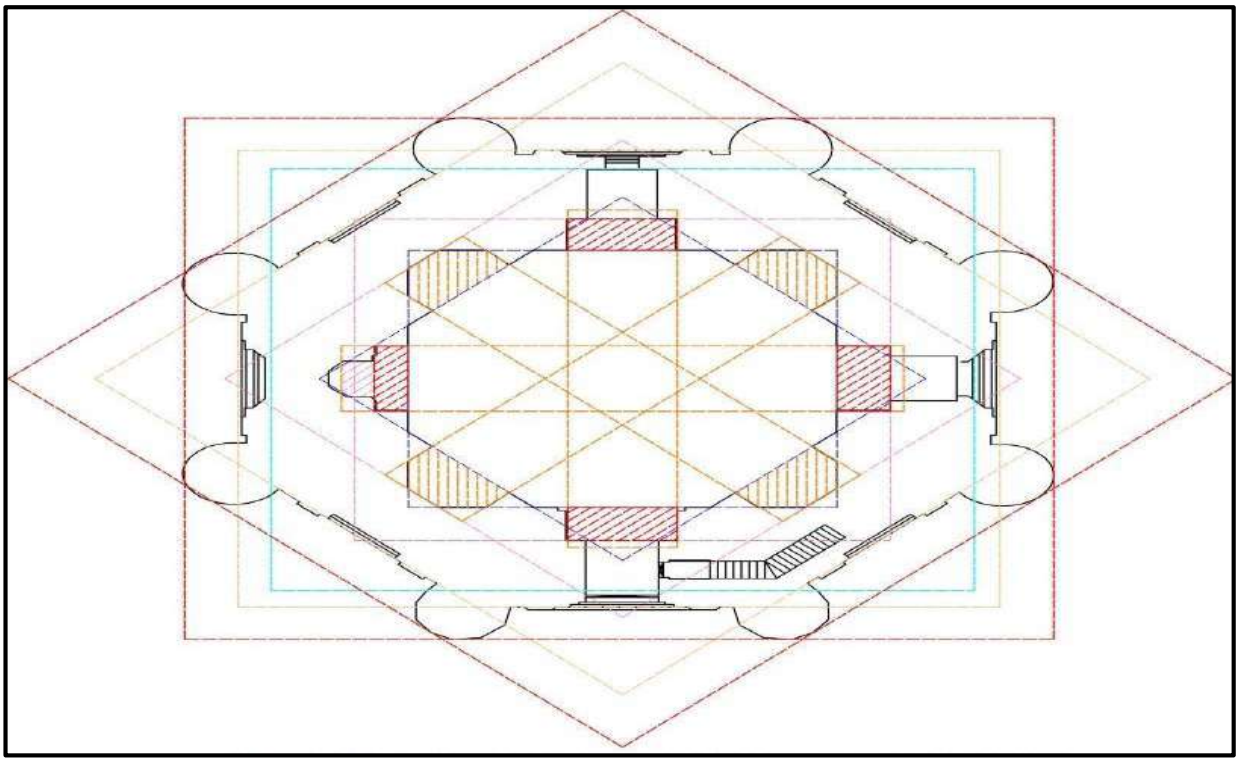


Figure 04(J) Step 11: **- Draw 3rd Square from Inside**

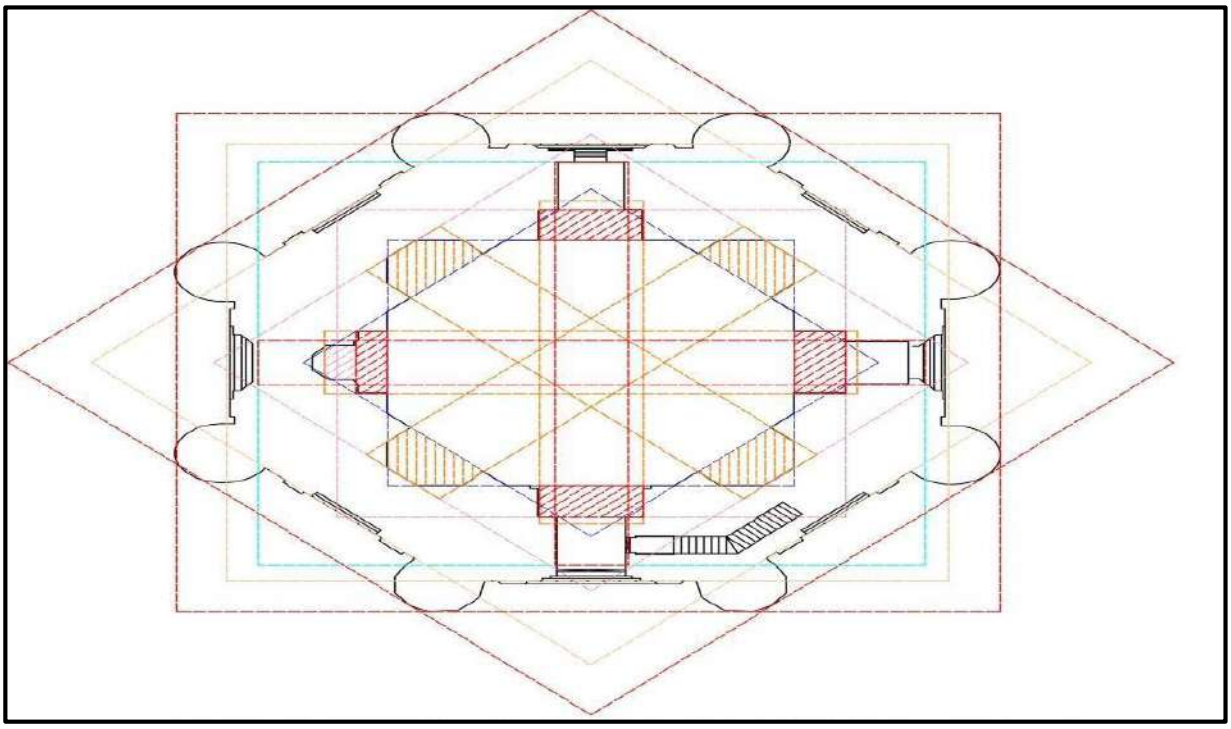


Figure 04(K) Step 12: - **Draw Two Cross Rectangles from Intersection of Inside Square and Rotated Square to 3rd Square**.

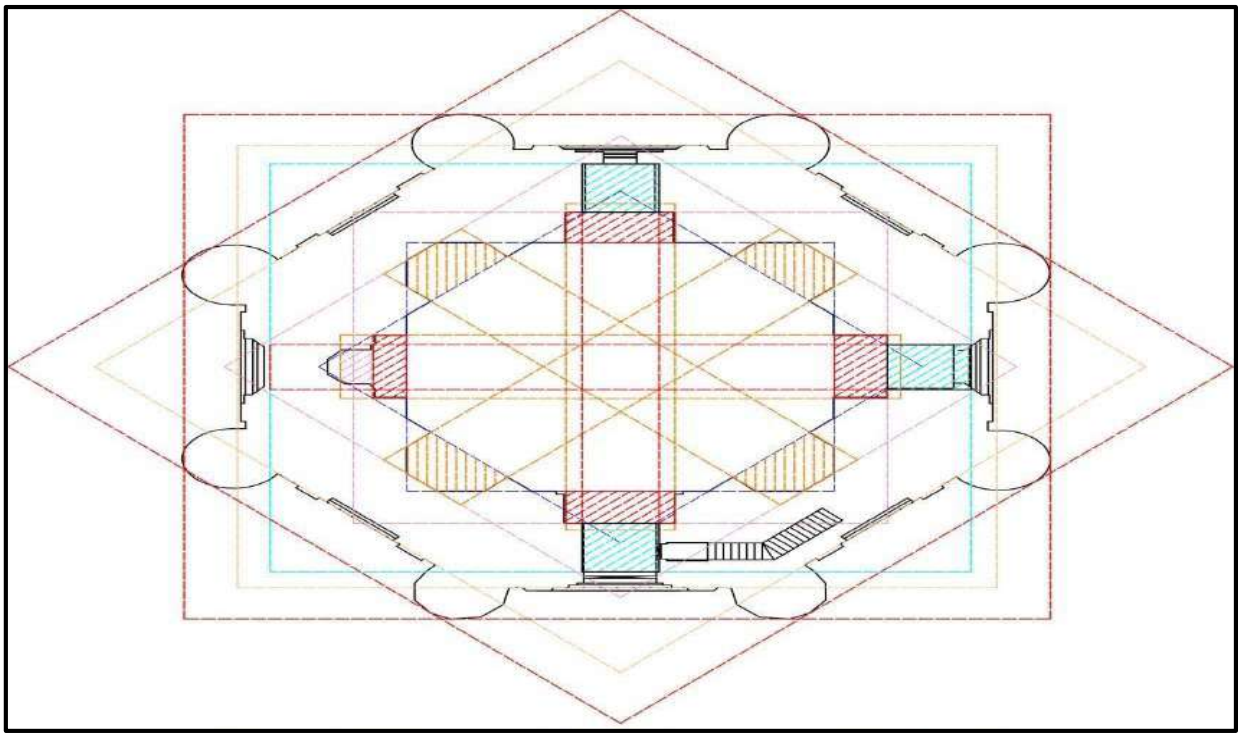


Figure 04(L) Step 13: - **Hatch out The Traced Areas**

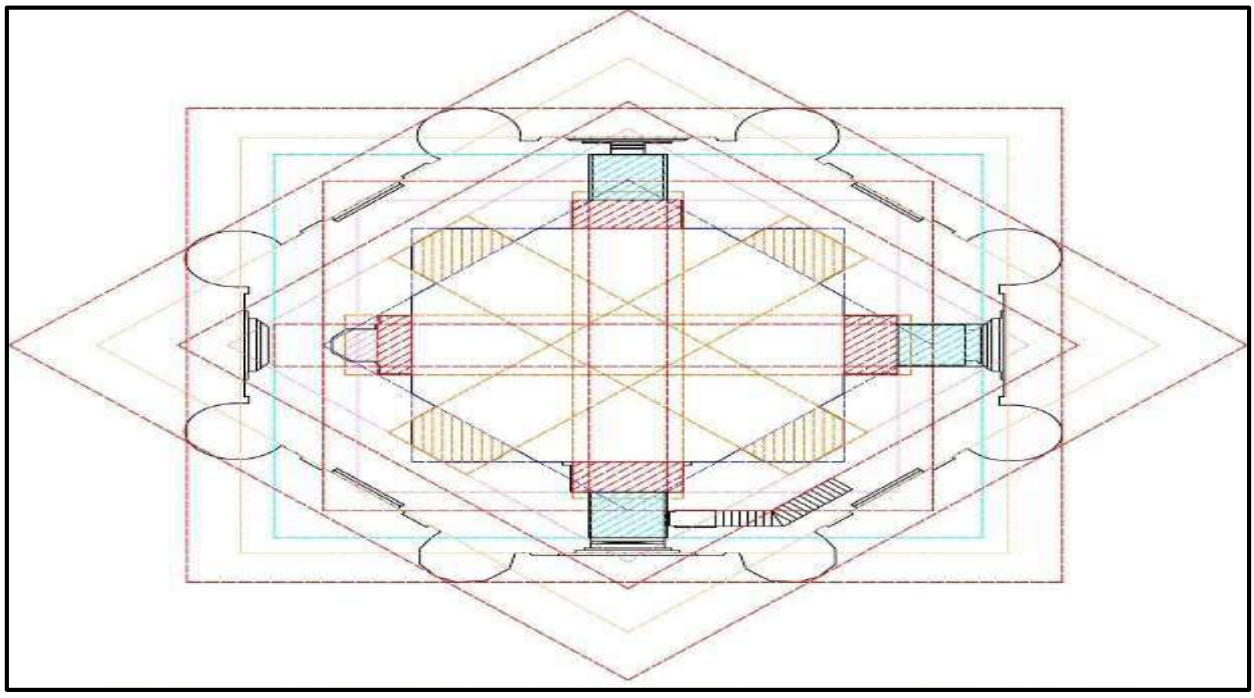


Figure 04(M) Step 14: - **Draw Square and Rotated Square at 2'7" Offset to Trace Stairs**

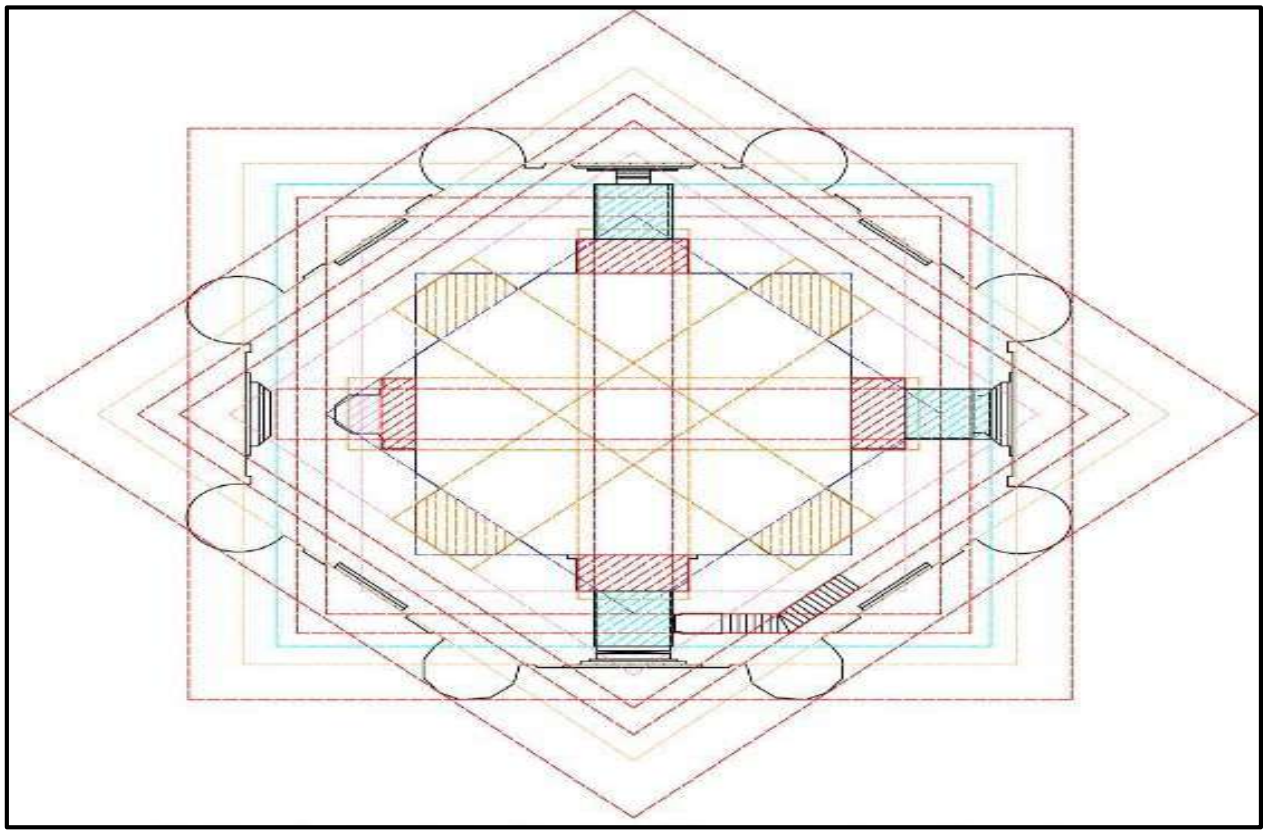


Figure 04(N) Step 15: - **Draw Other Square and Rotated Square at 2'2" Offset of Previous to Trace Stairs**

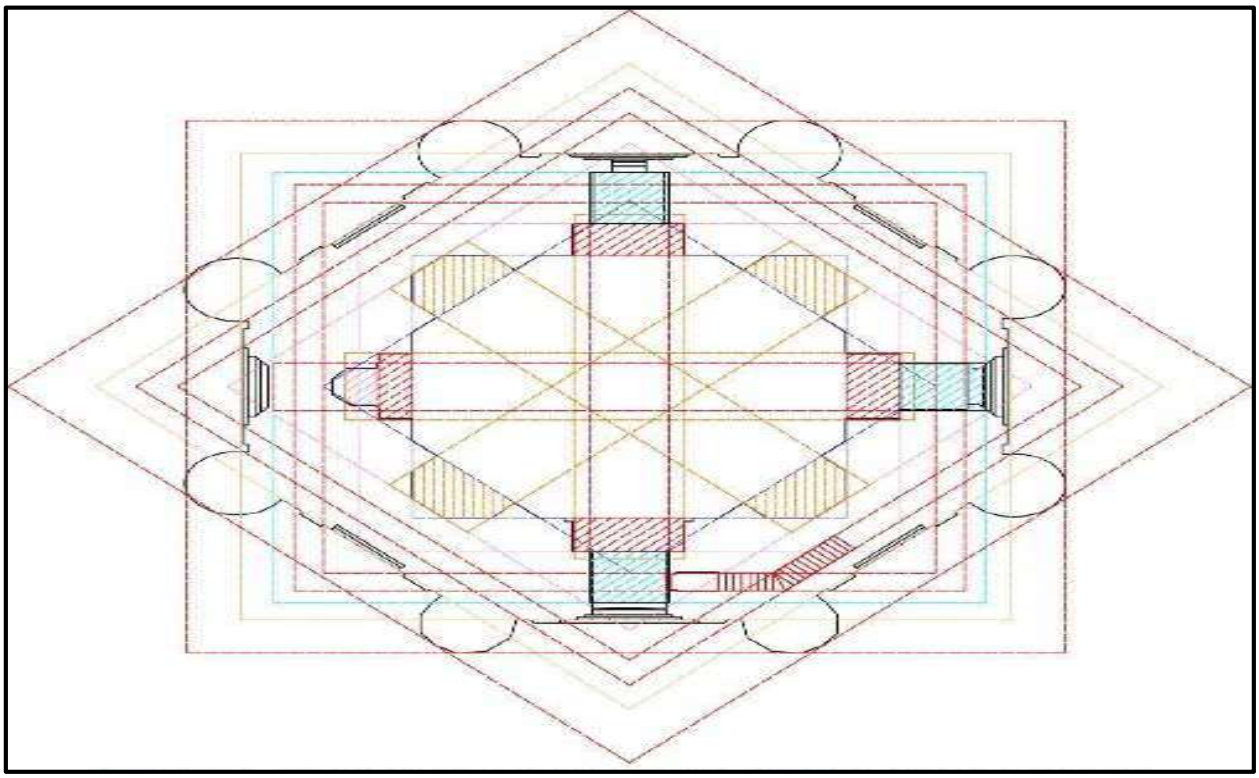


Figure 04(O) Step 16: - **Draw Diagonals to Trace Stairs Width**

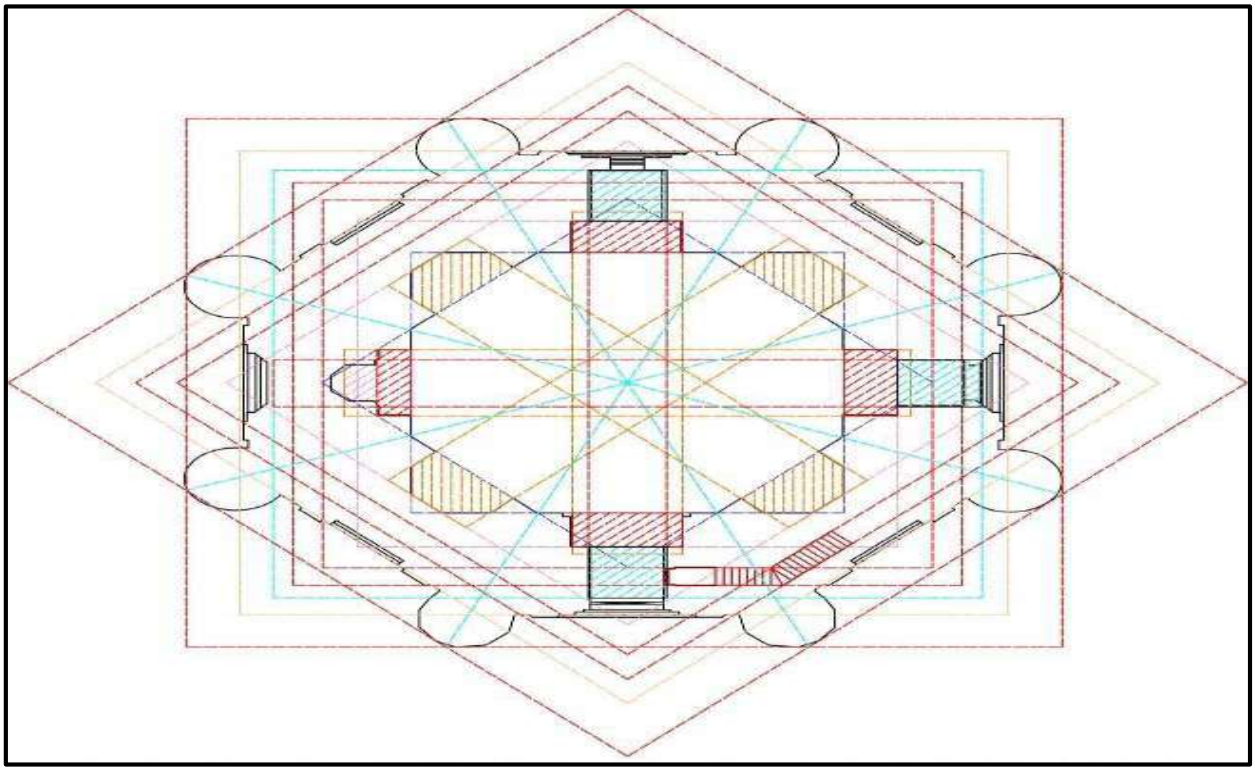


Figure 04(P) Step 17: - **Draw Diagonals from Intersection Point of Each Buttresses to center of Tomb.**

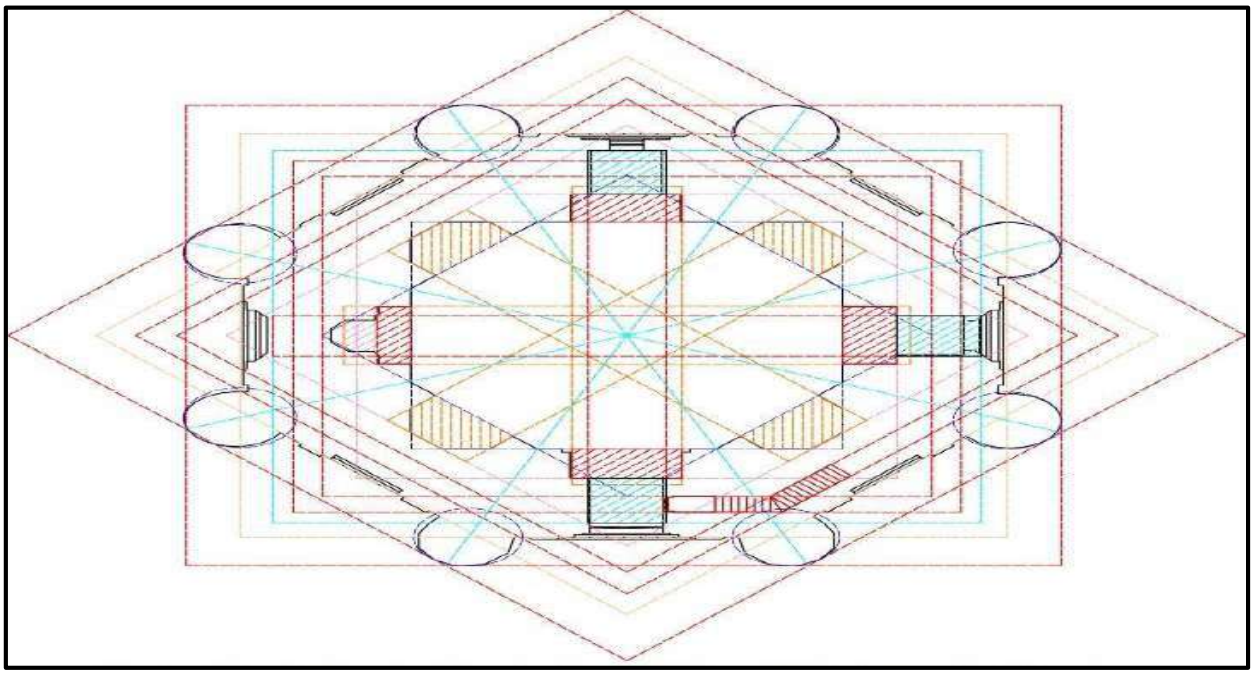


Figure 04(P) Step 18: - **Draw Semi Circles from Intersection Point of Diagonals and Square to Trace Each Buttress**

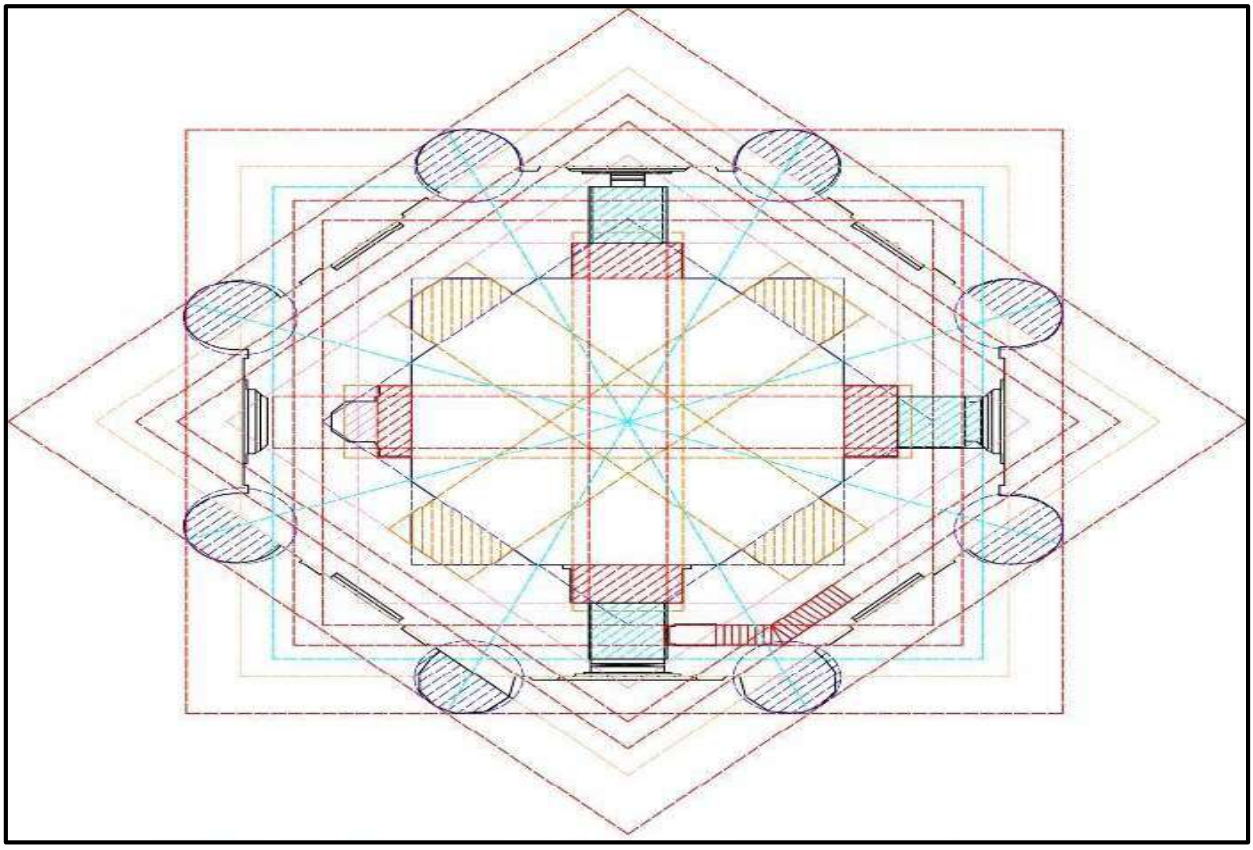


Figure 04(Q) Step 19: **-Hatch Out the Traced Buttresses**

5.3. Dome Construction

The dome of Shah Rukn-e-Alam is one of the earliest large-scale brick domes in South Asia. Measuring approximately **15 meters in diameter**, it rests on a **cylindrical drum** that transitions seamlessly from the octagonal base.

Key features of the dome construction include:

- **Structural ingenuity**: The drum distributes the dome's weight evenly across the octagonal base, while battered walls and buttresses counteract lateral thrusts.
- **Symbolism**: The dome represents the celestial sphere, enclosing the tomb chamber in an image of the cosmos.
- **Proportional harmony**: The dome's curvature follows a semicircular profile, with its apex aligning vertically above the tomb's center — reinforcing the symbolic axis mundi (Burckhardt, 1976).

The Multan dome predates Mughal domes by nearly two centuries, serving as a **prototype for Humayun's Tomb (1569–1572)** and, eventually, the Taj Mahal (1632–1648).

Figure 5: *First Floor Plan (Source: Archeology Department Multan)*

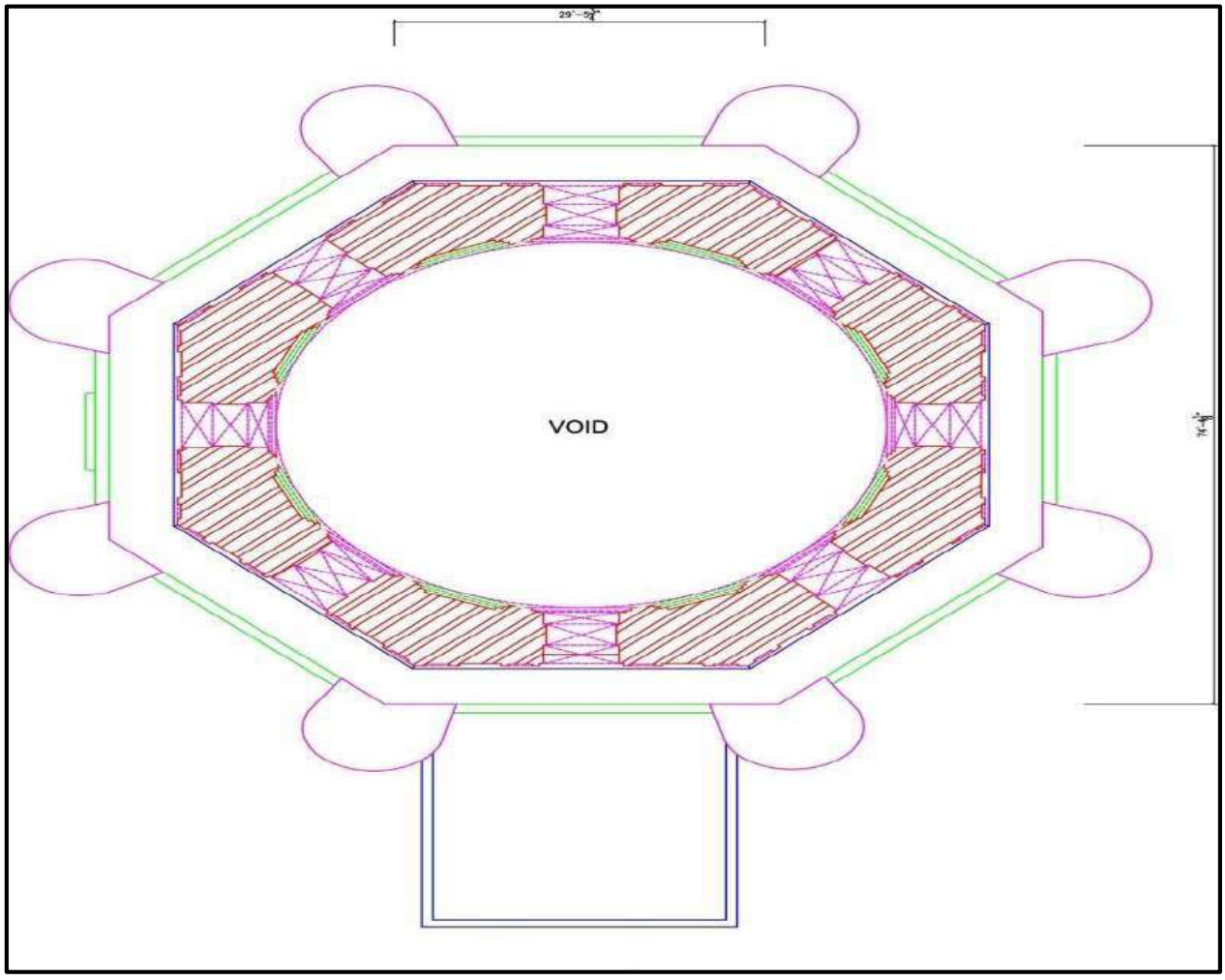
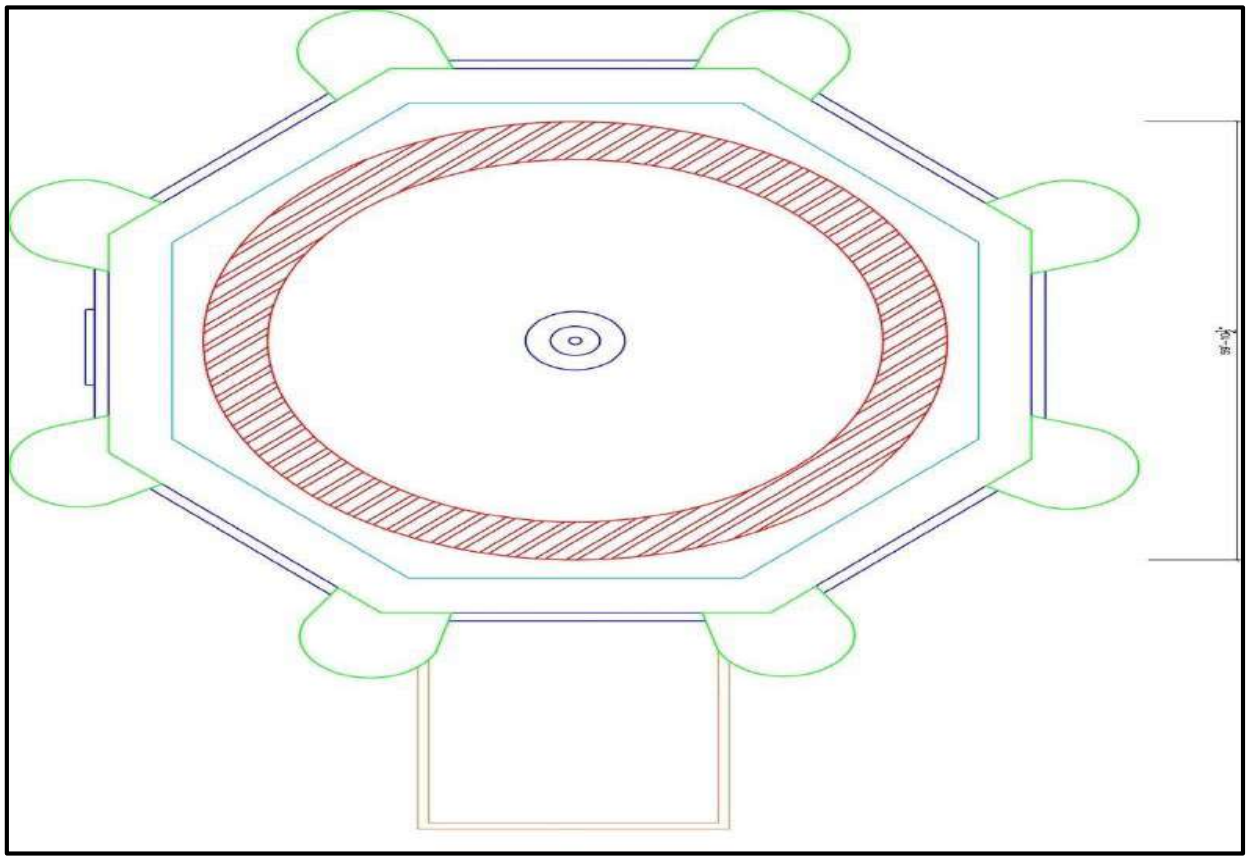


Figure 6: *Dome Floor Plan (Source: Archeology Department Multan)*



5.4. Buttresses and Structural Reinforcement

The shrine's octagonal base is reinforced by **massive corner buttresses**, each projecting outward in alignment with the diagonals of the plan. These buttresses serve dual purposes:

- **Structural**: They absorb the lateral thrust of the dome and strengthen the battered walls.
- **Geometric**: Their placement follows geometric diagonals, linking structural necessity with symbolic design.

This shrine consists of the buttresses which are tapered upwards and culminates in small turrets on them, they are not only alleviate the shrine visually but also helps to highlight the vertical emphasis of the shrine which guides the

5.5. Elevation and Vertical Rhythm

The tomb is divided vertically into **three regular zones**:

1. **Lower Tier**: which is consist of massive tapered walls constructed of brick and complete bar for recessed arches.
2. **Upper Tier**: the octagonal walls which are narrow but rising above the first, distinct ornamental bands of glazed blue tiles.
3. **Dome Zone**: this zone has a high drum with a hemispherical dome on it, which reflects a sense of fulfilment.

This triple division in its vertical elevation reflects Sufi cosmology behind its design:

- The **earthly realm** (lower tier),
- The **intermediary realm** (upper tier),
- The **divine realm** (dome).

The shrine thus encodes metaphysical teachings into its very elevation.

5.6. Integration of Ornament and Geometry

The Shah Rukn-e-Alam's shrine is not a structural monument but also this integrates geometry into its ornamentation. There are geometric divisions in the bands of glazed tile which represents the transition between three vertical zones. The calligraphic bands on the elevation also gives a proportional break to ensure that its ornamentation reinforces the building rather that confusing it.

The color scheme of the shrine further highlights its geometrical settings:

- Blue tiles accentuate vertical lines.
- White tiles emphasize horizontal divisions.
- Geometric star patterns echo the underlying octagonal plan.

This integration of ornament with geometry reflects what Grabar (1983) calls the **"mediation of ornament"** — the way decoration translates metaphysical concepts into visual experience.

5.7. Symbolic Axis and Spatial Orientation

The tomb is intentionally oriented towards Makkah along the qibla axis, which aligns its geometrical order with its spiritual basis. The connection of its earthly chamber with the heaven is reflected by dome's function as an **axis mundus**. The saint's grave is centrally placed under the dome which emphasizes his role as moderator between the community and the divine power.

5.8. Comparative Analysis of Proportions

When compared to other mausoleums:

- **The Samanid Mausoleum (Bukhara, 10th century)** → it is small in scale, proportions derived from cube, antecedent of octagonal shaped plans.
- **The Tomb of Oljeitu (Sultaniyya, 1302–1312)** → it has an immense dome with intricate tilework, also with close contemporary influence on it.
- **The Humayun's Tomb (Delhi, 1569–1572)** → this tomb inherited an octagonal form along with dome ratio but it developed symmetry and scale.
- **Taj Mahal (Agra, 1632–1648)** → this building grasped the esthetic precision of proportions and balance, yet it is deeply-rooted in the same system seen at Multan's shrine having square–octagon–circle arrangement.

This Shah Rukn-e-Alam's shrine can be taken as a **prototype** for funerary architecture in south Asia which brought together the central Asian patterns and Mughal masterworks.

5.9. Summary

The geometric analysis of the architectural details of this Shah Rukn-e-Alam's tomb illustrates

the integration of **sacred geometry, its structural originality, and symbolic denotation**. The proportional arrangement of the tomb reflect harmony; its dome also anticipates Mughal's interventions. Its ornamentation details environ its spiritual philosophy into its visual arrangement. The shrine reflects itself as a symbolic as well as technical achievement in the evolution of funerary architecture in south Asian region.

6. Ornamentation & Materiality

6.1. Introduction to Ornamentation in Islamic Architecture

The intricate ornamentation inn the Islamic funerary architecture is not only decorative but also its an addition of theology, cosmology and geometry. According to Grabar (1983), the ornamentation as a "mediator," is a device that helps to understand the abstract meta- physical concepts along with sensory configuration. It connects the spiritual world with material world, to represent the invisible philosophies of the divine power through it design. The tomb's ornamentation is basically an integral component of its enhanced design. The careful integration of **glazed tiles, brickwork, and calligraphy** reveals how ornament interacts with geometry to convey layered meanings.

6.2. Materiality of the Tomb: Brick and Glaze

The tomb is primarily constructed of **baked brick**, a material abundant in the Punjab region but also deeply symbolic. Brick construction ties the shrine to local vernacular traditions, reflecting a synthesis of **imperial design and regional craft** (Flood, 2009). The massive brick walls are reinforced with lime mortar representing engineering precision in balancing weight and thrust.

Glazed tiles (*kashi-kari*) were applied over the brick surfaces, creating a intense relation of texture and color. The technique involved firing ceramic tiles with colored glazes, then embedding them into architectural surfaces. Multan was a renowned center of this craft, and Shah Rukn-e-Alam's shrine stands as one of the earliest large-scale uses of **kashi work in South Asia** (Allen, 1986).

6.3. The Color Palette: Symbolism of Blue, White, and Green

The shrine's ornamentation is dominated by three colors: **blue, white, and green**. Each color carries symbolic significance in Islamic cosmology (Munshi, 2019):

- **Cobalt Blue**: Associated with spirituality, divine knowledge, and the infinite expanse of the heavens. It draws the viewer's gaze upward, reinforcing the dome's celestial symbolism.
- **Turquoise Blue**: Evokes protection and healing, frequently associated with paradise in Persian traditions. Its luminosity softens the heaviness of the brick structure.
- **White**: Represents purity, divine mercy, and peace. White tiles are strategically used in calligraphic bands, reinforcing the sacredness of the inscriptions.
- **Green** (seen in later restorations): Symbolizes paradise and eternal life, strongly associated with the Prophet in Islamic tradition.

The deliberate placement of these colors creates a **chromatic hierarchy**, guiding both spiritual interpretation and visual experience.

6.4. Calligraphy as Ornament and Text

One of the most striking features of the shrine is the integration of **Qur'anic inscriptions** into its

decorative scheme. Bands of calligraphy run horizontally across the tiers of the elevation, inscribing verses from the Qur'an directly onto the architecture.

This serves multiple functions:

1. **Spiritual**: It transforms the shrine into a **textual space**, embedding divine words into the physical fabric of the monument (Michell, 1995).
2. **Didactic**: For pilgrims, inscriptions function as reminders of spiritual truths, reinforcing the saint's role as a guide.
3. **Aesthetic**: Calligraphy provides rhythm and proportion, marking the transition between architectural zones.

The use of **Kufic and Thuluth scripts** reflects Persian and Central Asian influences, but their integration into Multan's vernacular traditions demonstrates cultural adaptation.

6.5. Geometric Ornamentation

Beyond color and script, the shrine employs geometric patterns such as **stars, polygons, and interlaced bands**. These patterns echo the underlying geometry of the structure — squares, octagons, and circles — reinforcing the unity of form and surface.

Critchlow (1976) argues that such patterns represent infinity and transcendence through repetition. On Shah Rukn-e-Alam's shrine, the tessellations not only beautify the monument but also **extend its cosmological symbolism outward**, enveloping the saint's tomb in a microcosm of divine order.

6.6. Integration of Ornament and Structure

The unique features which the design of Shah Rukn-e-Alam's shrine has is its alignment of ornamentation complementing its structural divisions.

- Horizontal tile bands coincide with tier divisions.
- Vertical ornament emphasizes buttresses and turrets.
- Calligraphy frames transition points in elevation.

This integrated arrangement guarantees that the ornamental details do not make the architecture obscure but it enhances aesthetics through geometry. In this way, this shrine demonstrates the Islamic principle of **tawḥīd** — which means the uniformity of form, its purpose, and denotation.

6.7. Restoration of Ornamentation

The shrine went through a significant restoration by the Auqaf Department of Pakistan in 1970s, with the support of UNESCO. The focus of this restoration works was to restore its glazed tilework and calligraphic details as the original ornamentations had vanished to some extent due to weather effects and carelessness.

- **Successes**: Traditional Kashigar artisans were employed, ensuring continuity of craft techniques. The restoration revived the monument's iconic blue-and-white façade, reestablishing its visual prominence.
- **Challenges**: Conservationists raised concerns about **authenticity**, arguing that large-scale replacement of tiles risked erasing the historical patina (Flood, 2009).
- **Ongoing Issues**: Environmental factors, including pollution and humidity, continue to

threaten tile surfaces, highlighting the need for sustainable conservation practices.

The deliberations continued to whether its conservation should either prioritize the **material legitimacy** (preserving the damaged parts) or its **visual integrity** (to restore the lost ornamentation to preserve appearance).

6.8. Summary

The ornamental details and its materials disclose a noteworthy amalgamation of **skill, symbolism, and geometry**. Its construction with brick anchors the Shah Rukn-e-Alam's tomb in local traditions, but the glazed tiles and calligraphic details have connection to the wide-ranging Persianate and Islamic architectural aesthetics. The colors are used in symbolic manner, embedded with Qur'anic verses and its ornamentation along with structural arrangement. The symbolic use of color, the embedding of Qur'anic text, and the alignment of ornament with structure emphasize the shrine's spiritual worth.

The restoration works of 20th-century ensured survival, also showed the constraints during conservation its intricated details in such a way that admire both material's originality and cultural significance. Eventually, the ornamentation intricacy of the shrine renovates it into a **cosmic text in brick, glaze, and script**.

7. Cultural & Symbolic Interpretations

7.1. Introduction: The Shrine as a Living Symbol

The Shah Rukn-e-Alam's tomb is a **living cultural institute** to understand geometry behind its arrangement, ornamentation, and social functions. According to the Sufi cosmology, its architecture symbolizes meta-physical facts and its function as doorway between the people and the divine supremacy. This shrine validates this combination, where mathematical accuracy and divine symbolism emphasize the saint's eternal existence in Multan's communal and religious life.

7.2. Geometry and Sufi Metaphysics

The Islamic geometry on this shrine is a reflection of **meta-physical concepts in Sufism.** Nasr (1987) claims that sacred geometry of the shrine is a representational expression of the principle of *tawḥīd* (divine unity). The forms of the shrine embody this principle:

- **The Square** → symbolizes material reality, the four elements, and the human condition.
- **The Octagon** → mediates between material and spiritual realms, embodying transition and transformation.
- **The Circle/Dome** → symbolizes perfection, infinity, and the divine.

The architectural progression from square to octagon to circle mirrors the **Sufi path** (*ṭarīqa*), where the soul moves from multiplicity (worldly attachments) to unity (union with the divine). Burckhardt (1976) interprets such architectural transformations as a metaphysical "journey in stone."

Thus, Shah Rukn-e-Alam's tomb is not merely a resting place for a saint but a **didactic monument**, visually encoding the stages of spiritual ascent for devotees.

7.3. Color Symbolism and Spiritual Experience

The shrine's color scheme reinforces its symbolic meaning. As Munshi (2019) and Allen (1986) note, **blue** tiles evoke the sky and spiritual knowledge, **white** represents purity and divine mercy, and **green** (later additions) symbolizes paradise. For pilgrims, these colors are not abstract — they create a **multi-sensory spiritual experience**.

The interplay of colors with geometry ensures that the shrine is experienced not only intellectually but emotionally and spiritually. As visitors approach the monument, the glowing blue-and-white façade produces a sense of transcendence, aligning the **aesthetic journey** with the **spiritual journey**.

7.4. The Saint as Mediator

In Sufi belief, saints (*awliyāʾ Allāh*) act as **intermediaries between God and humanity**. Trimingham (1971) and Eaton (2019) emphasize that shrines are viewed as places where the saint's baraka (spiritual blessing) continues to flow after death.

The shrine of Shah Rukn-e-Alam embodies this role architecturally:

- The **central axis** of the dome aligns directly above the saint's grave, reinforcing the idea that he anchors the community to the divine.
- Pilgrims circumambulate the tomb, mirroring cosmic movements, enacting the symbolism of circle and infinity.
- The tomb chamber's orientation toward Mecca integrates personal devotion with universal worship.

This dual symbolism — geometry as cosmology, and the saint as mediator — ensures that the shrine functions as a **spiritual compass** for the community.

7.5. Rituals and Pilgrimage (Ziyārat)

The shrine is the site of continuous **ritual practice**, particularly the annual *ʿurs* (death anniversary of the saint). Eaton (2019) describes *ʿurs* as both a commemoration of the saint's death and a celebration of his eternal union with God. During the festival:

- Thousands of devotees gather, reciting Qur'an, singing *qawwālī* (Sufi devotional music), and performing rituals.
- The shrine becomes a site of **collective memory**, where spiritual and social bonds are reinforced.
- Pilgrimage acts as a **social equalizer**, drawing participants from diverse backgrounds — rich and poor, rural and urban.

Daily rituals also include **lighting of lamps, offering of food, and recitation of prayers**, practices that reinforce the saint's ongoing role in the community.

7.6. The Shrine as a Social Institution

Historically, Sufi shrines in South Asia were not only spiritual centers but also **social welfare institutions**. Gilmartin (1979) shows how Multan's shrines provided food to the poor, shelter to travelers, and mediation in disputes. Shah Rukn-e-Alam's tomb continues this legacy today:

- **Langar (communal meals)** are distributed daily.
- The shrine supports local artisans, especially tile-makers, ensuring continuity of traditional crafts.
- The shrine acts as a **cultural hub**, hosting festivals, gatherings, and musical events.

In this sense, the shrine embodies the Islamic principle of **khidmat al-khalq** (service to humanity), extending the saint's spiritual mission into tangible social benefits.

7.7. The Shrine and Collective Identity

The tomb has become a defining **symbol of Multan's identity**. Its silhouette dominates the city skyline, and its image is widely used in cultural representations, tourism, and regional pride. For the people of Multan, the shrine is not only a religious site but also a **marker of belonging**.

As Anderson (1991) argues in *Imagined Communities*, monuments play a key role in shaping collective identity. The shrine of Shah Rukn-e-Alam functions in this way, binding communities together through shared rituals, memories, and visual symbols.

7.8. Cosmological Interpretations

Islamic architecture often encodes cosmological symbolism. Necipoğlu (1995) and Grabar (1983) note that geometric designs evoke the order of the universe. Shah Rukn-e-Alam's tomb can be read as a **miniature of conception**:

- The **square base** represents the earth.
- The **octagon** symbolizes transition and transformation.
- The **dome** embodies the heavens.

The Sufi cosmology aligns with the shrine's spatial hierarchy, which shows the saint as a **pole of the universe (qutb)** to create a connection with divine supremacy. It is a cosmic diagram in brick and tile, which positioned the saint at axis of the material and spiritual world.

7.9. Symbolism in Pilgrimage Pathways

The physical appearance of the shrine has symbolic sense. It makes pilgrims to arise from the lower city to the raised site of the Multan's fort, indorsing a **ritual of ascent**. This journey towards the elevated site reflects the soul's ascension towards the divinity. Once entering inside the tomb, the tomb's chamber makes pilgrims to connect through cosmic cycles, transforming their journey into the meditation.

7.10. Modern Symbolism and Heritage Politics

In this era, this shrine embodies both the cultural and religious symbolism. Its addition into the UNESCO's Tentative List (2023) reflects its universal importance, but it also arises the arguments and debates between its **ownership and representation**. Some give an argument that treating shrine mainly as a heritage asset risk restraining its continuing spiritual character.

But its fame in Pakistan's cultural tourism makes it **national symbol**, surpassing its local context. In this way, the shrine has a dual identity— one is a sacred space and other is historic masterpiece which mirrors that shrine have complex layers of symbolic meanings.

7.11. Summary

The Shah Rukn-e-Alam's shrine's symbolic and cultural interpretations disclose that the monument functions concurrently as:

- As a **geometrical Cosmo-gram**, encrypting meta-physical facts.
- As a **ceremonial space**, framing devoutness and pilgrimage.
- As a **cultural and social institute**, offering communal welfare and societal identity.
- Aa a **symbolic milestone**, representing both its local pride and national heritage asset.

In this way, the shrine exceeds its function as a tomb, operating instead as a **living cosmology in architecture**.

8. Comparative Study

8.1. Introduction: The Need for Comparison

The tomb of Shah Rukn-e-Alam has often been described as a **prototype for later South Asian mausoleums** (Golombek, 1981; Asher, 1992). Yet its place in the broader history of Islamic funerary architecture is best understood when compared with **Persian, Central Asian, and Mughal precedents**. Such a comparative framework highlights both **continuities of form and symbolism** and the **local innovations** that made the Multan shrine distinctive.

8.2. Central Asian Precedents

The earliest Islamic mausoleums in Central Asia provided the architectural DNA for later South Asian shrines.

- **Samanid Mausoleum (Bukhara, 10th century)**: A cube-shaped brick structure with intricate brick ornamentation. Its square-to-octagon transition and domed roof foreshadow later octagonal shrines (Golombek & Wilber, 1988). Compared to Shah Rukn-e-Alam's tomb, it is smaller in scale but similar in reliance on brickwork and geometric derivation.
- **Gur-e-Amir (Samarkand, 1404)**: Built as the tomb of Timur, it features a monumental dome on a tall drum, glazed tile ornament, and axial symmetry. Shah Rukn-e-Alam's shrine anticipates many of these features, though with more austere proportions.
- **Mausoleums of Merv and Konya**: These octagonal-domed shrines reveal the widespread use of the square-octagon-circle sequence, a tradition Multan inherited through migrating artisans and Sufi networks.

Central Asian shrines emphasized monumental domes and glazed tile façades, both of which resonate in the Multan tomb. Yet, Shah Rukn-e-Alam is distinctive in its reliance on local **brick tectonics** rather than stone or marble.

8.3. Persian Influences

The **Ilkhanid period** in Persia (13th–14th centuries) was crucial for shaping funerary architecture.

- **Tomb of Oljeitu (Sultaniyya, 1302–1312)**: One of the largest domes of the medieval world (25 m), its interior geometry and exterior tilework reveal a sophisticated integration of structure and ornament (Blair & Bloom, 2003). Shah Rukn-e-Alam's dome is smaller but follows the same geometric logic of circularity rising from an octagonal base.

- **Seljuk Mausoleums (Isfahan and Khorasan)**: Their brick ornamentation, muqarnas transitions, and epigraphic bands influenced the stylistic vocabulary of South Asian shrines.

The Persian tradition's emphasis on **chromatic tilework** is directly echoed in Multan's kashi-kari. However, while Persian monuments often employed stone cores with tile revetments, Multan innovated by merging **structural brick** with decorative tile, creating a uniquely regional synthesis.

8.4. Early South Asian Shrines (Pre-Mughal)

Before Shah Rukn-e-Alam, South Asia already hosted smaller Sufi shrines.

- **Tomb of Bahauddin Zakariya (Multan, d. 1262)**: A square plan with a smaller dome, it established the precedent of monumental shrines in Multan. Shah Rukn-e-Alam's tomb expanded this model, introducing an octagonal plan and a massive hemispherical dome.
- **Other Sultanate Mausoleums (Delhi, 13th–14th centuries)**: Square-based tombs with modest domes reflected Delhi's early experiments. This shrine has a distinctive importance due to its enormous scale and complexity of its geometry.

Therefore, the shrine is perceived as a **defining moment** from where funerary architecture in south Asia took a transitional turn from simple square shrines to wide-ranging geometric arrangement.

8.5. Mughal Adaptations

The Mughals started building a tradition of **Indo-Islamic mausoleum** with the most precise arrangement in 16th century which were basically influenced from the Shah Rukn-e-Alam's tomb.

- **The Humayun's Tomb (Delhi, 1569-1572)**: it was built by Persian architect, having an octagonal plan, dome with high drum, use of glazed tiles on large-scale and white marble (Asher, 1992). The dome has proportions of **1:1 dome-to-base ratio** which can be seen in Multan's shrine.
- **Akbar's Tomb (Sikandra, 1605–1613)**: A monumental tiered structure with strong geometric symbolism. Unlike Shah Rukn-e-Alam, it lacks a dominant dome but inherits the vertical emphasis.
- **Taj Mahal (Agra, 1632–1648)**: The culmination of Mughal mausoleum architecture, its perfect symmetry and proportional harmony reflect centuries of experimentation. While clad in white marble, the underlying **square-octagon-circle system** remains consistent with Multan's early model.

The Mughal mausoleums thus represent both a continuation and a transformation of the **Shah Rukn-e-Alam prototype** — expanding scale, refining ornament, and universalizing symbolism.

8.6. Points of Continuity

Across these traditions, certain elements remain constant:

- **Octagonal plans** mediating between square and circle.
- **Domes as cosmological symbols**, representing the heavens.
- **Ornamental tilework and calligraphy** as carriers of divine meaning.

- **Integration of geometry and symbolism**, linking form with cosmology.

These continuities situate Shah Rukn-e-Alam firmly within the global Islamic architectural tradition.

8.7. Points of Distinction

Yet Shah Rukn-e-Alam's shrine is also unique in several respects:

- **Brick as primary material**, unlike Persian stone or Mughal marble.
- **Massive battered walls**, characteristic of Tughluq architecture, distinguishing it from later Mughal elegance.
- **Primitive use of monumental dome** in South Asia, predating Mughal innovations.
- **Amalgamation of the Sufi identity**, with tomb as a dynastic monument along with a social and spiritual hub for community.

These peculiarities make this shrine not only a **regional Centre**, but also empowering it to inspire many other architectural traditions.

8.8. Symbolic Comparisons

Beyond its structural contrasts, symbolism in it also express continuity:

- Like the **Samanid Mausoleum**, Shah Rukn-e-Alam's tomb emphasizes earth-to-heaven geometry.
- Like **Oljeitu's Tomb**, it integrates massive dome volume with tile ornament.
- Like **Humayun's Tomb and the Taj Mahal**, it translates cosmological symbolism through proportion.

But the shrine's **Sufi cosmology and communal role** makes it unique, as it is not onlt a tomb but also an **existing spiritual institution** for community.

8.9. Summary

This comparative study illustrates that Shah Rukn-e-Alam's tomb inhabits a vital position in the **lineage of Islamic mausoleums:**

- Rooted in **Central Asian and Persian prototypes**,
- Expanded within the **South Asian Sultanate context**,
- Anticipating the **refinements of Mughal architecture**.

This shrine has an innovative and unique construction style using brick masonry as main construction material, exceptional dome composition and representational integration which ensures its role as prototype and benchmark in the evolution of Islamic funerary architecture.

9. Discussion

9.1. Introduction: From Geometry to Meaning

This tomb of Shah Rukn-e-Alam represents the Islamic architectural traditions not only as functional creation but also as an **amalgamation of symbolism, materialism, exceptional use of geometry and communal togetherness.** So, the shrine's proportions, ornamental symbolism and social participation make it a **multi-layered cultural landmark.** This debate puts these

findings of the prior sections into a broader deliberation in the history of architecture, studies of Sufism, and heritage conservation of shrines.

9.2. Geometry as Sacred Language

The shrine has **"geometry of the spirit"** called by Critchlow (1976), consists of geometrical system of squares, circles, octagons. This shows the tomb is not purely a mathematically precise building but also have theological expression.

- The tomb has 1:1 ratio between dome and base proportions which transmit harmony and balance.
- The evolution from its base to dome reflect its **Sufi cosmology of ascent**, from where the souls travel from assortment towards one power.
- The axial alignment above the saint's tomb situates him as a mediator at the **axis mundi**.

In this way, shrine's geometry aids as both, its **structural reasoning** and **meta-physical pedagogy**, which educates wordlessly through its forms and symbolism.

9.3. Ornamentation as Visual Theology

The meta-physical language of this shrine is emphasized by its intricate ornamentation like the glazed tile work, calligraphically details, and color scheming. These elements are not just decorative layers but also creating sensory experience through **extensions of geometry** (Grabar, 1983).

- **Blue tiles** draw the eye upward, evoking the heavens.
- **Calligraphic bands** inscribe divine words into the walls, embedding scripture in space.
- **Geometric tessellations** echo infinite repetition, mirroring divine infinity.

Together, these elements transform the shrine into what Burckhardt (1976) would describe as a **cosmic diagram**, where surface and structure are unified in spiritual expression.

9.4. The Saint as the Center of Cosmology

The shrine's geometry and ornament revolve around the figure of Shah Rukn-e-Alam himself. In Sufi cosmology, the saint (*walī*) is understood as a **qutb**, or pole, around which the spiritual world revolves (Trimingham, 1971).

- The physical placement of his tomb beneath the dome symbolizes this cosmic centrality.
- Pilgrimage rituals; circumambulation, offering, recitation.
- The shrine becomes both **tomb and cosmic axis**, connecting community to divinity.

Thus, the architecture is inseparable from the **charismatic authority of the saint** and the **ritual life of the community**.

9.5. Comparative Continuities and Innovations

The comparative study reveals both continuities and innovations:

- From **Persian and Central Asian prototypes**, Multan inherited octagonal planning, domical symbolism, and tilework.
- From **local vernacular traditions**, it inherited the use of brick, massive battered walls, and regional ornament styles.

- For the **Mughal tradition**, it offered a prototype; demonstrating large-scale dome construction, geometric integration, and symbolic layering.

The shrine thus occupies a **nodal point** in the genealogy of Islamic funerary architecture; simultaneously rooted in the past and anticipatory of the future.

9.6. The Shrine as Social Institution

The shrine's cultural role extends beyond symbolism into **everyday life**. As Gilmartin (1979) and Eaton (2019) note, Sufi shrines were centers of hospitality, justice, and welfare. Shah Rukn-e-Alam's tomb continues this tradition through:

- Distribution of food (*langar*).
- Employment of artisans in restoration and craft production.
- Acting as a site of **collective memory** and **cultural identity** for Multan.

Thus, geometry and ornament are not abstract ideals; they are embedded in the **social economy of devotion**. The shrine is as much about people as it is about proportions.

9.7. Heritage, Authenticity, and Modernity

Modern restoration has raised questions about **authenticity** and **heritage politics**. Should conservation prioritize **original material** (even if decayed) or **visual integrity** (through replacement)? The UNESCO-supported restoration of the 1970s privileged the latter, reviving the shrine's iconic appearance but raising debates about historical loss (Flood, 2009).

These differences mirror broader issues in heritage conservation of the historical shrines:

- These historic shrines like Shah Rukn-e-Alam are **living monuments**, not inert museums.
- Conservation of such monuments must have a sense of balance between **ceremonial functions** with **historic integrity**.
- The shrine function as a spiritual Centre and tourist attraction, so these dual purposes of shrine make the preservation strategies more complicated.

9.8. Synthesis: Architecture as Lived Cosmology

Bringing these strands together, the shrine of Shah Rukn-e-Alam emerges as an **architectural synthesis**:

- **Structural ingenuity** ensures its stability.
- **Geometric order** encodes metaphysical truth.
- **Ornament and calligraphy** inscribe theology into surfaces.
- **Ritual practice** animates space through lived devotion.
- **Comparative continuity** situates it in a transregional tradition.
- **Social functions** root it in community life.

In this way, the tomb functions not only as a **monument of architecture** but as a **cosmogram of society and spirituality** where metaphysics, geometry, and community converge.

9.9. Conclusion of Discussion

The shrine of Shah Rukn-e-Alam is not an isolated monument but a **palimpsest of traditions**

Persian, Central Asian, South Asian and a **prototype for Mughal innovation**. It is simultaneously:

- A **technical masterpiece** of early brick dome construction.
- A **symbolic structure** encoding Sufi cosmology.
- A **living institution**, mediating between past and present, sacred and social.

The discussion emphasizes that the tomb's lasting significance lies not only in its **historical origins** but in its ability to continuously generate **meaning, identity, and community** across centuries.

10. Conclusion & Future Research

10.1. Restating the Core Argument

This study of the shrine of Shah Rukn-e-Alam has demonstrated that Islamic architecture in South Asia cannot be understood merely as structural achievement or ornamental tradition, but as a **fusion of geometry, spirituality, and social function**. The Multan tomb embodies a multi-layered identity:

- Architecturally, it pioneers the integration of **square–octagon–circle geometry** in South Asia.
- Structurally, it represents one of the earliest and most monumental **brick domes** in the Islamic world.
- Ornamentally, it unites **tilework, calligraphy, and geometric patterns** into a coherent cosmological text.
- Spiritually, it encodes **Sufi metaphysics**, situating the saint as mediator between earthly and divine realms.
- Socially, it remains a **living institution**, serving as a center of devotion, identity, and community welfare.

Thus, Shah Rukn-e-Alam's shrine is not only a tomb but a **cosmogram in brick and glaze**, a monument where geometry becomes theology and architecture becomes a lived spirituality.

10.2. Contributions of the Study

This research contributes to several domains of scholarship:

1. **Architectural History**: By situating the shrine in dialogue with Persian, Central Asian, and Mughal prototypes, the study highlights its role as a **pivotal transitional monument**.
2. **Geometric Analysis**: Through AutoCAD-based reconstructions, it demonstrates the shrine's reliance on precise **proportional systems**, confirming the centrality of sacred geometry in its design.
3. **Sufi Studies**: By linking geometry and ornament to Sufi metaphysics, the study illustrates how architecture serves as **embodied theology** in South Asian Islam.
4. **Heritage and Conservation**: By examining restoration debates, it underscores the challenges of conserving **living shrines** that are simultaneously sacred, social, and historical.

These contributions make the study relevant not only to architectural historians but also to scholars of religion, heritage managers, and conservationists.

10.3. Future Research Directions

While this research has provided a comprehensive analysis, several avenues remain open for deeper exploration:

- **Digital Heritage Documentation**: Advances in 3D scanning, photogrammetry, and Building Information Modeling (BIM) can enable more precise documentation of the shrine's geometry, ornamentation, and structural performance. Such methods can also assist in conservation planning.
- **Comparative Geometric Studies**: Further comparative work could analyze the proportional systems of other South Asian shrines (e.g., Uch Sharif, Delhi Sultanate tombs) to map the **regional diffusion of geometric principles**.
- **Material Analysis**: Scientific studies of Multan's tilework (chemical composition, glazing techniques) could provide insights into craft traditions and transregional exchanges of technology.
- **Sociological Fieldwork**: Ethnographic research on contemporary practices at the shrine (pilgrimage, qawwālī, charity) could expand understanding of how architecture continues to shape lived religion in Pakistan today.
- **Climate Resilience and Conservation**: Given the threats of urbanization, pollution, and climate change, future studies must explore **sustainable conservation models** that balance material authenticity with functional needs of pilgrims.

10.4. Closing Reflection

The shrine of Shah Rukn-e-Alam demonstrates that architecture is not a static artifact but a **dynamic cultural process**. Its geometry translates eternal metaphysical truths, yet its social life evolves across centuries. It connects **local craft traditions** with **global Islamic aesthetics**, while serving both as a **heritage landmark** and a **living sacred space**.

Ultimately, the study affirms that Shah Rukn-e-Alam's tomb is not only one of the great monuments of Islamic architecture but also a reminder that **geometry, spirituality, and community** can converge in built form to produce meaning that endures across time

Conflict of Interest

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