AL – AFAQ
Jurnal Ilmu Falak dan Astronomi
Fakultas Syariah Universitas Islam Negeri (UIN) Mataram
P-ISSN: 2685-0176. E-ISSN: 2722-0176 Vol. 7, No. 2 Desember 2025

Astronomical Measurement and Fiqh Review of Qibla Deviation: A Case Study of Mosque and a Cemetery Complex in Timbuseng, Takalar

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Abstract: *This research addresses the issue of inaccurate Qibla direction by evaluating the degree of deviation at the Assalam Mosque and the public cemetery in Timbuseng Hamlet, Takalar, and analyzing it based on tolerance limits established in Islamic Jurisprudence (Fiqh) and Astronomy (Ilmu Falak). The study aims to examine the conformity of the Qibla direction at these case study locations with the actual direction towards the Ka'bah. The methods employed include measuring the existing azimuth using Google Earth, followed by field measurements with a compass and Istiwa'aini to obtain real values for the existing azimuth and the Qibla azimuth. The measurement results were then analyzed by applying Qibla tolerance theories. The findings reveal that the Qibla direction of the Assalam Mosque has a deviation of 12°, which, according to the Shafi'i school of jurisprudence, far exceeds the tolerance limit. Similar results were found in the grave orientations within the cemetery complex, which showed deviation variations between 21° and 30°. However, from the perspectives of the Hanafi, Maliki, and Hanbali schools, the deviations occurring in both the mosque and the graves remain within permissible limits. These findings confirm a discrepancy between field conditions and sharia standards, particularly when referring to the Shafi'i school, which is predominantly adhered to by Muslims in Indonesia, including in Takalar. Therefore, this study recommends correction and massive socialization regarding the importance of Qibla accuracy, as well as the use of more precise calibration tools such as theodolites dan Istiwa'aini.*
Keywords: *Qibla Direction, Evaluation, Tolerance Theory, Mosque, Cemetery, Takalar*

Abstrak: *Penelitian ini mengangkat masalah ketidaktepatan arah kiblat dengan mengevaluasi besarnya simpangan arah kiblat di Masjid Assalam dan kompleks pemakaman Dusun Timbuseng, Takalar, serta menganalisis berdasarkan batas toleransi yang ada dalam Fikih dan Ilmu Falak (astronomi). Tujuan penelitian adalah untuk menguji kesesuaian arah kiblat di lokasi studi kasus tersebut dengan arah Ka'bah. Metode yang digunakan meliputi pengukuran azimuth eksisting menggunakan aplikasi Google Earth, dilanjutkan dengan pengukuran lapangan dengan kompas dan Istiwa'aini untuk mendapatkan nilai real azimuth eksisting dan azimuth qiblat. Hasil pengukuran kemudian dianalisis dengan menerapkan teori toleransi kiblat. Hasil penelitian memaparkan bahwa arah kiblat Masjid Assalam memiliki simpangan 12° dan apabila mengacu pada fiqh mazhab Shafi'i, maka simpangan ini telah melampaui batas toleransi. Hasil serupa terjadi pada arah kuburan di kompleks pemakaman yang menunjukkan variasi simpangan antara 21° hingga 30°. Adapun menurut pandangan madzhab Hanafi, Maliki dan Hanbali maka simpangan yang terjadi pada Mesjid maupun pemakaman masih dalam batas toleransi. Temuan ini mengonfirmasi adanya ketidaksesuaian antara kondisi di lapangan dengan standar syar'i, khususnya jika mengacu pada mazhab Shafi'i sebagaimana yang umumnya dipegangi oleh umat islam di Indonesia termasuk di Takalar. Oleh karena itu, penelitian ini merekomendasikan koreksi dan sosialisasi yang masif mengenai pentingnya ketepatan arah kiblat, serta penggunaan alat kalibrasi yang lebih presisi seperti teodolit dan Istiwa'aini.*
Kata Kunci: *Arah Kiblat, Evaluasi, Teori Toleransi, Masjid, Kuburan, Takalar*

A. Introduction

The issue of Qibla direction encompasses two fundamental aspects: direction (bearing) and angular magnitude (azimuth) for a location. In other words, this issue answers: how many degrees the Qibla

angle is from true north, and in which direction (e.g., northwest, west, etc.) one should face.[1] The accuracy of the Qibla direction is a fundamental issue in contemporary Islamic jurisprudence and modern science, as it is directly linked to the validity of an act of worship. In Islam, facing the Qibla (the Ka'bah) is a mandatory requirement (shart) for the validity and quality of a Muslim's prayer.[2] This is as commanded in several verses of the Qur'an, such as Surah Al-Baqarah verses 144, 149, and 150.[3] This obligation also receives attention in the jurisprudence of funeral management, where the position of facing the Qibla must be arranged for the deceased in the grave. This opinion is held by the majority of scholars from the various schools of thought, except for the Maliki school, which only recommends it.[4]

In practice, the main challenge lies in determining the Qibla direction accurately. In Indonesia, where the majority of Muslims adhere to the Shafi'i school of thought with its strict view on deviation tolerance, many mosques and graves were established based solely on estimations or inherited cultural traditions.[5] Historically, traditional methods such as using constellations (for example, the Polaris star as a determinant of the north direction) were considered sufficient in their time. Other methods that are still commonly used—such as facing west under the assumption that Mecca lies directly to the west or relying on a magnetic compass—are prone to error because they do not account for the Earth's spherical shape, magnetic variation, and Indonesia's geographical position, which is not precisely to the east of Mecca.[6]

Along with advances in science, qibla determination methodology has shifted toward spherical trigonometry calculations and precise technological tools.[7] However, previous research still leaves several academic gaps. First, many studies focus only on mosques or graves, thus failing to provide a comparative analysis within a single community. Second, there is often a disconnect between astronomical (falak) analysis, which yields numerical deviation data, and in-depth, cross-madhhab jurisprudential analysis. Research frequently presents only calculations and general tolerances without a detailed legal examination based on the four schools of law and their contextualization with contemporary falak science tolerance standards.

Due to inaccuracies in traditional methods, many mosques, prayer rooms, and graves built decades ago potentially have deviant qibla directions. For example, a study of the Kedatuan

[1] A. Jamil, *Astronomy: Theory and Application* (Jakarta: AMZAH, 2021). p. 134.
[2] Ibnu Rusyd, *Bidaayatul Mujtahid Wa Nihayatul Muqtashid*, I (Kairo: Maktabah Ibnu Taimiyah, 1994), p. 274.
[3] Slamet Hambali, *Astronomy: Qibla Direction at Any Given Moment* (Yogyakarta: Pustaka Ilmu, 2013). p. 2.
[4] Abdul Rahman Al-Jaziri, *Al-Fiqhu 'Ala Al-Madzahib Al-Arba'ah* (Beirut: Dar Al-Kutub Al-'Ilmiyyah, 2003), p. 485.
[5] Ahmad Izzuddin, *Practical Astronomy* (Semarang: Pustaka Al-Hilal, 2017). p. 20.
[6] Ahmad Musonnif and Kutbuddin Aibak, *Methods of Determination and Accuracy of Qibla Direction in Mosques in Tulungagung* (Tulungagung: IAIN Tulungagung Press, 2018). p. 2.
[7] Balkis Sifawara Alawiya and Ahmad Izzuddin, "The Relevance of Determining the Qibla Direction Using Star Constellation Data in the Book Suwar Al-Kawakib," *Al-Afaq* 5, no. 2 (2023): 151–165. p. 164.

Selaparang Tomb in East Lombok found significant discrepancies.[8] Another research gap lies in the limited number of studies that simultaneously test qibla accuracy for two distinct entities—mosques for the living and graves for the deceased—within the same geographical and sociological environment, even though the two have different legal bases and potential technical implications.

In responding to this issue, jurists and falak experts have provided various perspectives on deviation tolerance limits. Jurisprudentially, the four major schools have diverse criteria. Meanwhile, in the context of Indonesian falak science, several approaches have emerged, such as the 2° tolerance limit from Thomas Djamaluddin, the Iḥtiyāth al-Qiblah concept with a strict tolerance of 0°24' from Ma'rufin Sudibyo, and Slamet Hambali's emphasis on accuracy with a maximum tolerance of 1° for minor deviations. The convergence between jurisprudential and falak approaches forms the foundation for a comprehensive evaluation, yet the research gap is evident in the lack of simultaneous application of these various contemporary falak tolerance standards to real field deviation data, which is then confronted with the criteria of all jurisprudential schools to produce holistic recommendations.[9]

Timbuseng Hamlet, Takalar Regency, was chosen as the research locus considering its community's religious characteristics and strong traditional values. The Assalam Mosque and the cemetery complex in the hamlet are two vital facilities in religious life. Analyzing the qibla direction of these two facilities is essential to ensure that prayer worship and burial processes comply with Islamic law. Therefore, this study aims to fill the identified gaps through a comprehensive analysis that integrates falak and jurisprudential approaches to two vital facilities in a single location—an aspect often studied separately. The results are expected to provide concrete recommendations with direct impact for the community of Timbuseng Hamlet.

Based on the above explanation, this research aims to: measure the factual qibla direction of the Assalam Mosque and the orientation of headstones in the Timbuseng Hamlet cemetery complex; calculate its theoretical qibla direction; analyze the degree of deviation between the two; and evaluate the permissibility status of the deviation based on the perspective of jurisprudential tolerance.

B. Method

1. Research Type and Approach

This study is field research employing a qualitative approach. The qualitative method is applied because it is exploratory and suitable for investigating problems that require in-depth conceptual

[8] Putri Rizkika Purnama Sari, Siti Rabi'atul Adawiyah, and Muhammad Harfin Zuhdi, "Questioning the Qibla Direction Determination of the Kedatuan Selaparang Tomb in East Lombok Using the Istiwa'aini Method," *Al-Afaq* 5, no. 2 (2023): 166–181. p. 180.

[9] Nurul Resky Ridhayanti, "Tolerance of Qibla Direction Deviation from the Perspectives of Islamic Jurisprudence and Astronomy (A Study on the Thoughts of Muh. Ma'rufin Sudibyo, Thomas Djamaluddin, and Slamet Hambali)" (UIN Walisongo Semarang, 2024). p. 153-154.

analysis and lack a rigid theoretical foundation,[10] as is characteristic of qibla deviation, which simultaneously involves technical and normative aspects. Operationally, this qualitative approach is implemented through: (1) astronomical analysis of qibla deviation using spherical trigonometry calculations in falak science, and (2) normative analysis of the fiqh aspects by examining primary reference texts from the four schools of Islamic law (Hanafi, Maliki, Shafi'i, and Hanbali). Thus, this method enables an in-depth exploration to address the research problem from two complementary perspectives.

2. Research Location and Time

This research was conducted at Assalam Mosque and the Cemetery Complex in Timbuseng Hamlet, East Polongbangkeng District, Takalar Regency, South Sulawesi. Field measurements were carried out on Saturday, August 15, 2025, corresponding to 21 Safar 1447 H, from 10:00 AM to 4:00 PM Central Indonesia Time (WITA).

3. Data and Data Source

a. Primary Data: The mosque's Qibla azimuth and grave headstone orientations, obtained through direct field measurements using a compass and Istiwa'aini rod.

b. Secondary Data:
   - Geographic coordinates of the Assalam Mosque Timbuseng location: Latitude 5°21'57.63" S, Longitude 119°30'49.37" E.[11]
   - Coordinates of the Timbuseng Hamlet Cemetery: Latitude 5°22'01,54" S, Longitude 119°31'12.84" E.[12]
   - Coordinates of the Ka'bah: Latitude 21°25'21.41" N, Longitude 39°49'34.33" E.[13]
   - Comparative fiqh data from the authoritative texts of the Hanafi, Maliki, Shafi'i, and Hanbali schools of thought.

4. Data Collection Techniques

a. Observation: Conducting direct observation of the research objects.

b. Measurement:
   1) Measuring the mosque building's azimuth using Google Earth software
   2) Measuring the Qibla azimuth using the Istiwa'aini instrument. The Istiwa'aini operates by observing the sun's shadow. The device's internal software calculates the difference between the sun's azimuth at that moment and the Qibla azimuth. This angular difference is then used to calibrate and directly read the deviation of the headstone's orientation from the instrument. Measurements with the Istiwa'aini were conducted at the appropriate time

[10] John W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (California: SAGE Publications, 2009). p. 102.
[11] Google, "Google Earth Pro," 2025. Accessed on 9 November 2025 at 16.50 WITA
[12] Google. Accessed on 9 November 2025 at 16.50 WITA
[13] Google. Accessed on 9 November 2025 at 16.50 WITA

under clear weather conditions to ensure the sun's shadow was clearly visible, thereby enhancing the accuracy of the results.

3) Calculating the existing mosque azimuth by measuring the direction of the main prayer line (saff), represented by the prayer mats, the direction of the pulpit (minbar), or the mihrab wall. Meanwhile, the existing cemetery azimuth was determined by measuring the longitudinal direction of the headstones (from foot to head), which is considered to represent the body's facing direction.

4) Calculating the theoretical Qibla azimuth using spherical trigonometric equations (Cosine formula and Sine formula)
Cotan AQ = (Cotan b sin a / sin C) – Cos a Cotan C[14]
Where:
a= 90° - Site Latitude;
b = 90° - Ka'bah Latitude; and
C = Site Longitude – Ka'bah Longitude[15]
Note:
- If Site Longitude = 00°00’ to 39° 49' 34.33" E, then C = 39° 49' 34.33" – Site Longitude;
- If Site Longitude = 39° 49' 34.33" to 180°00’ E, then C = Site Longitude - 39° 49' 34.33";
- If Site Longitude = 00° 00' to 140°10’ W. then C = Site Longitude + 39° 49' 34.33";
- If Site Longitude = 140° 10' to 180°00’ W, then C = 320° 10' + Site Longitude;[16]

c. Documentation: Photographing the entire research process and objects to support the data.

5. Data Analysis Techniques

a. Falak Science Analysis:

1) Calculating the theoretical Qibla azimuth (Q) from the research location to the Ka'bah. The formula used: Cotan AQ = (Cotan b sin a / sin C) – Cos a Cotan C
2) Calculating the magnitude of deviation for both the Mosque and Cemetery (Δ): Δ = | Existing Azimuth - Theoretical Azimuth |
3) Comparing the deviation (Δ) with the tolerance limits of modern falak science.

b. Jurisprudential (Fiqh) Analysis:

1) Hanafi’s Mazhab: Analyzing whether the deviation remains within 45° to the left or right of the precise direction (the more lenient jihah al-ka'bah). Deviations under 90° are still tolerated. The majority of Hanafi scholars conclude that for those unable to see the Ka'bah, the direction of prayer (qibla) is the general direction of the Ka'bah, not its physical

[14] Susiknan Azhari, *Astronomy: Theory & Practice* (Yogyakarta: Suara Muhammadiyah, 2004)., p. 28.
[15] Azhari, p. 28.
[16] Mursyid Fikri, *Module for Learning Astronomy: Part 1* (Makassar: LPP Unismuh Makassar, 2021). p. 24-25.

structure.[17] This directional tolerance is termed "jihah sughra," permitting a deviation of 45° to the right and 45° to the left of the exact direction.

According to the Hanafis Mazhab, facing the qibla for a distant person is analogous to the muthallath principle. This principle indicates that a worshiper (musalli) is permitted to face slightly to the right or left of the true qibla direction. The logic for jihah sughra is based on the spherical nature of the human head (a 360° arc), while the defined frontal facing area is approximately a 90° arc (a quarter circle). This definition of the "face" for qibla direction spans from the outer corner of the right eye to the outer corner of the left eye. Therefore, even if only part of the face is directed towards the qibla, it is still considered valid for a distant person.[18]

2) Maliki's Mazhab: Analyzing based on the principle of maximal effort (ijtihad) in determining the qibla direction, with a tolerance limit of 90°. This is understood because the majority of Maliki scholars opine that for those who cannot see the Ka'bah, the qibla is the direction towards the Ka'bah, not its physical building.[19]

Thus, it can be concluded that as long as one faces a direction within the sector between North (0°/360°) and West (270°), the prayer remains valid. This is because the North-to-West sector (spanning 90°) represents the "general direction" (jihah) where the city of Mecca and the Ka'bah are located for those south of Mecca. In this context, the calculated azimuth of 292° falls within this North-West sector.

3) Shafi'is Mazhab: Analyzing whether the occurring deviation exceeds the limits for facing the specific Ka'bah building ('ain al-ka'bah). This aligns with the opinion affirmed by Imam Nawawi within the Shafi'i school, which obligates facing the Ka'bah building for those outside it. The qibla for those inside Al-Masjid al-Haram is the Ka'bah itself, as they can see it directly. For those outside the mosque but within Mecca city, the qibla is Al-Masjid al-Haram, as seeing the Ka'bah is difficult and the mosque serves as a marker. For those outside Mecca city, the qibla is the city of Mecca itself, as reaching the mosque or Ka'bah is very difficult, and even reaching Mecca remains challenging. When converted to a degree measurement, the radius of the Haram area boundary is calculated as 0°5'38.63", derived from the sum of the northern boundary (0°3'22.5") and southern boundary (0°2'16.13") distances from the Ka'bah's center point as the primary reference. Therefore, the tolerance limit for the qibla direction according to the Shafi'i school is 0°5'38.63". According to the concept of ihtiyatul kiblat by Ma'rufin Sudibyo, the

[17] Arwin Juli Rakhmadi Butar-Butar, *Introduction to Astronomy: Theory, Practice, and Jurisprudence* (Depok: Rajawali Press, 2019). p. 51.
[18] Siti Nurul Iffah Faridah, "Tolerance of Qibla Direction According to the Hanafi School from the Perspective of Islamic Jurisprudence and Astronomy" (UIN Walisongo Semarang, 2017). p. 129.
[19] Butar-Butar, *Introduction to Astronomy: Theory, Practice, and Jurisprudence*. p. 53.

permissible deviation of the Qibla direction is 0°24' and applies to all regions of Indonesia.[20]

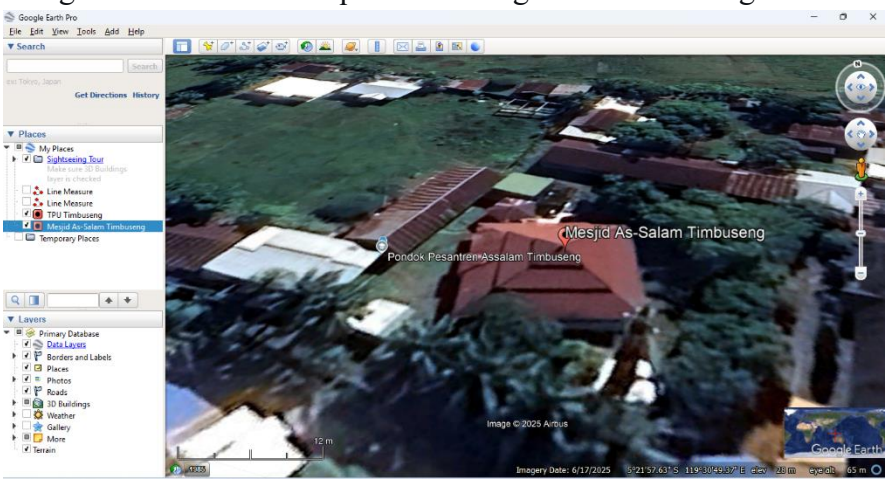
4) Hanbali's Mazhab: Analyzing based on the stipulation of facing the direction of the Ka'bah (jihah al-ka'bah), with a relatively lenient tolerance limit of 90°. This is derived from various analyses of Hanbali scholars' views, who concur on the obligation to face the direction of the Ka'bah (jihah al-ka'bah) for those unable to see it, rather than facing its specific structure.[21]

C. Results and Discussion

1. Coordinate Data and Theoretical Azimuth Calculation

a. Assalam Mosque

Figure 1. Assalam Mosque Timbuseng as seen via Google Earth



Given:

- Coordinates of Assalam Mosque: -5°21'57,63" S; 119°30'49,37" E
- Coordinates of the Ka'bah: 21° 25' 21.41"; 39° 49' 34.33"

Since the site's longitude falls between 39° 49' 34.33" E and 180°00' E, then C = Site Longitude - 39° 49' 34.33" E; Thus

C = 119° 30' 49,37" E - 39° 49' 34.33" E = 79°41'15,04"

Next:

a = 90° - Site Latitude = 90° - (-) 5°21'57,63" = 95°21'57,63"

b = 90° - Ka'bah Latitude = 90° - 21° 25' 21.41" = 68°34'38,59"

Therefore:

Cotan AQ = (Cotan b sin a / sin C) – Cos a Cotan C

[20] Muh. Ma'rufin Sudibyo, *Even the Prophet Turned: Qibla Direction and Its Measurement Methods* (Solo: Tinta Medina, 2011). p. 143.

[21] Butar-Butar, *Introduction to Astronomy: Theory, Practice, and Jurisprudence*. p. 56.

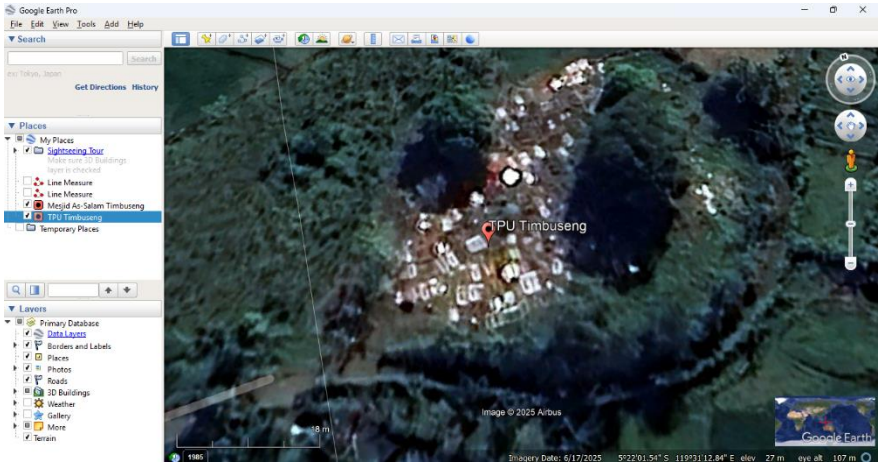
Cotan AQ = (Cotan 68°34’38,59” x sin 95°21’57,63” / sin 79°41’15,04”) – (Cos 95°21’57,63” x Cotan 79°41’15,04”)
Cotan AQ = (0,3923510888181 x 0,9956176207081 / 0,983846040643) – (-0,0935176632279 x 0,1819559799893)
Cotan AQ = (0,3906316575313 / 0,983846040643) – (-0,0170160980589)
Cotan AQ = 0,3970455146376 + 0,0170160980589
Cotan AQ = 0,4140616126965
AQ = 67°30’26,75”

Thus, the Qibla Direction (AQ) for Assalam Mosque Timbuseng is 67°30'26.75" (North-West), while its azimuth value is 360° - 67°30'26.75" = 292°29'33.25".

- The Theoretical Qibla Azimuth (AzQ) from Research Location 1 (Mosque): 292°29'33.25" (from true North)

b. ***Timbuseng Hamlet Cemetery***

Figure 2. Timbuseng Public Cemetery as seen via Google Earth



Given

- Coordinates of Cemetery Location: -5° 22’ 01,54” S; 119° 31’ 12,84” E
- Coordinates of Ka'bah: 21° 25' 21.41" N; 39° 49' 34.33" E

Since the site longitude falls between 39°49'34.33" E and 180°00' E, then C = Site Longitude - 39°49'34.33" E. Thus
C = 119° 31’ 12,84” BT - 39° 49' 34.33" BT = 79°41’38,51”
Then:
a = 90° - Site Latitude = 90° - (-) 5°22’01,54” = 95°22’01,54”
b = 90° - Ka’bah Latitude = 90° - 21° 25' 21.41" = 68°34’38,59”
Therefore:
Cotan AQ = (Cotan b sin a / sin C) – Cos a Cotan C
Cotan AQ = (Cotan 68°34’38,59” x sin 95°22’01,54” / sin 79°41’38,51”) – (Cos 95°22’01,54” x Cotan 79°41’38,51”)

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Cotan AQ = (0,3923510888181 x 0,9956158477883 / 0,9838664038238) – (-0,0935365363527 x 0,1818384294348)
Cotan AQ = (0,3906309619243 / 0,9838664038238) – (-0,0170085368651)
Cotan AQ = 0,3970365899335 + 0,0170085368651
Cotan AQ = 0,4140451267986
AQ = 67°30’29,66”

Thus, the Qibla Direction (AQ) for the Timbuseng Cemetery is 67°30'29.66" (N-W), while its azimuth value is 360° - 67°30'29.66" = 292°29'30.34".

- The Theoretical Qibla Azimuth (AzQ) from Research Location 2 (Cemetery): 292°29'30.34" (from true North)

Based on the calculations above, the Qibla azimuth for both locations is approximately 292°29'.

2. Results of Existing Azimuth Measurements and Deviation

Figure 3. Qibla direction of Assalam Mosque Timbuseng via Google Earth

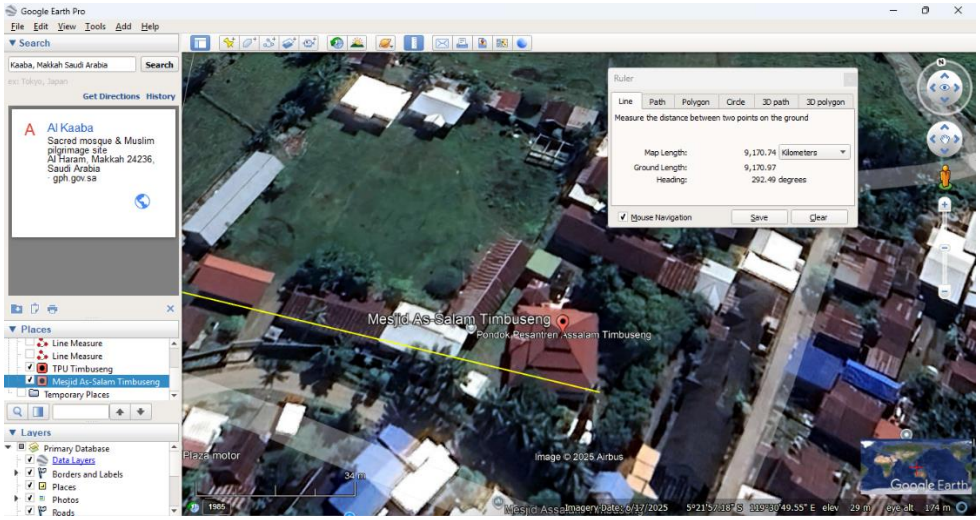

Figure 4. Building orientation of Assalam Mosque Timbuseng via Google Earth

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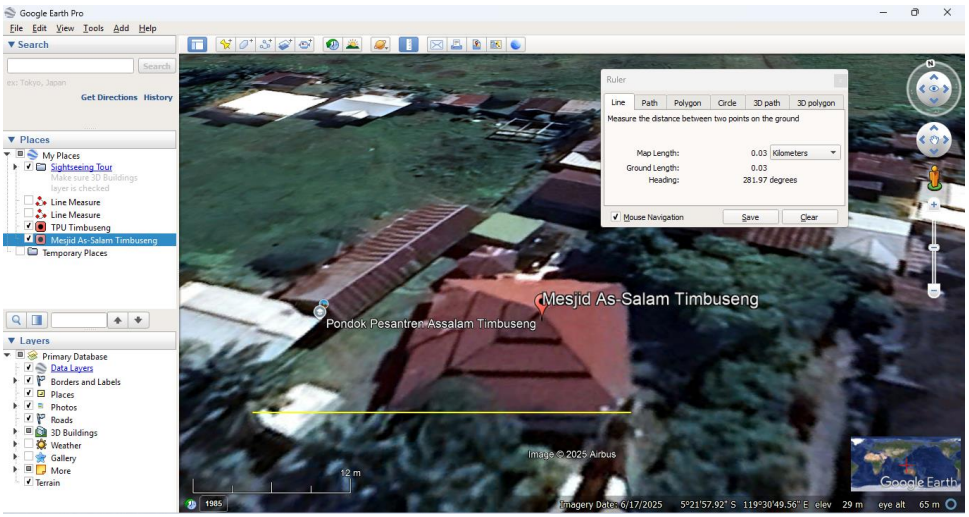

Based on Google Earth software, it was found that the existing mosque azimuth is 281.97° or 281°58'12", while the Qibla azimuth is 292.49° or 292°29'24". Thus, the difference between the mosque building's azimuth and the Qibla azimuth is 292°29'24" - 281°58'12" = 10°31'12". This deviation value serves as a preliminary reference before conducting direct measurements at the location.

Figure 5. Observation of Prayer Row Direction at Assalam Mosque Timbuseng

Based on field observations, it was confirmed that the mosque's Qibla direction aligns with the building's orientation.

Figure 6. Qibla direction measurement process at Assalam Mosque Timbuseng

After measurements were taken using the Istiwa'aini instrument, the difference between the direction of the Qibla (Ka'bah) and the Qibla direction of Assalam Mosque was found to be 12°

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from the Qibla azimuth. Thus, the azimuth of the mosque building can be determined as 292°29'24" - 12° = 280°29'24" W-N (West to North).

Figure 7. Magnitude of Qibla Direction Deviation at Assalam Mosque Timbuseng

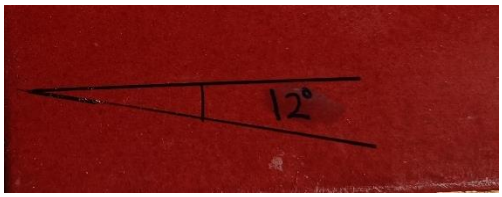
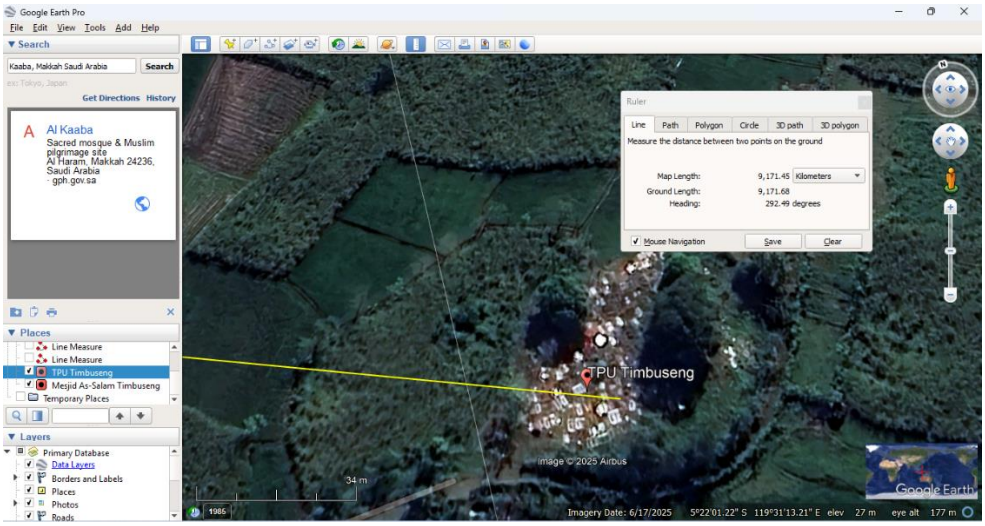


Figure 8. Qibla Direction of Timbuseng Public Cemetery via Google Earth



Based on Google Earth software, it was determined that the Qibla azimuth for the public cemetery should face 292.49° or 292°29'24" to point toward the Ka'bah (ʿayn al-kaʿbah). However, the azimuth of the individual grave markers could not be determined from the satellite imagery as Google Earth's display can only detect larger, more accessible structures. This value served as a preliminary reference before conducting direct measurements at the site.

Figure 9. Qibla direction measurement process at grave marker 1, Timbuseng Public Cemetery

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P-ISSN: 2685-0176. E-ISSN: 2722-0176 Vol. 7, No. 2 Desember 2025

The measurement of the grave marker's Qibla direction using the Istiwa'aini instrument began by placing the device on a grave, then observing the sunlight and the position of the two aligned gnomons. The instrument's levelness was verified using a waterpass. After inputting various data into the Istiwa'aini software, the difference between the sun's azimuth and the Qibla direction was found to be 6.2°, so the string was aligned to 6.2°. Following manual calculation, the deviation magnitude was determined to be 21° toward true West from the Qibla azimuth of 292°29'30.34". Thus, the azimuth of the first grave marker was determined to be 271°29'30.34".

Figure 10. Qibla direction measurement process at grave marker 2, Timbuseng Public Cemetery

For the second headstone measurement, after inputting the data into the Istiwa'aini software, the difference between the sun's azimuth and the Qibla direction was found to be 8.3°. Manual calculation revealed that the second grave headstone deviates 30° southward from the true Qibla direction. Thus, the resulting calculation is 292°29'30.34" - 30° = 262°29'30.34" W-S (West-South).

The summary of the direct field measurement results is as follows:

Table 1. Comparison of Calculated and Measured Qibla Azimuth Results and Their Deviations

No	Measurement Object	Theoretical Azimuth	Existing Azimuth	Deviation Magnitude (Δ)
1	Assalam Mosque	292°29'33.25"	280°29'24"	12°00'09,25"
2	Grave 1 (Southern Headstone)	292°29'30,34"	262°29'30,34"	30°00'00"
3	Grave 2 (Northern Headstone)	292°29'33.25"	271°29'30,34"	21°00'00"

Based on the data above, it is found that the magnitude of deviation between the Qibla direction and the mosque building or headstones is still considerable, ranging from 12° to 30°. This is certainly quite serious when viewed in relation to the jurisprudence of the Shafi'i School, which imposes strict rules in determining the Qibla direction.

3. Discussion Based on Falak and Fiqh Perspectives

These significant deviation findings will be critically analyzed through two scholarly lenses: falak science accuracy and the legal implications from cross-madhhab fiqh perspectives.

a. Falak Science Perspective

Based on spherical trigonometric calculations of the Qibla direction, several variations in Qibla azimuth values were identified. Contemporary falak experts in Indonesia hold differing opinions regarding the tolerance limits for Qibla direction deviation. Thomas Djamaluddin, for instance, sets a tolerance limit of 2°. The research results show that deviations at Assalam Mosque (12°) and the cemetery complex (21°-30°) far exceed this tolerance limit. This indicates highly significant inaccuracy. These errors stem from the use of traditional methods, such as the assumption that Mecca lies directly to the west. Additionally, the local community practices a heritage tradition known as *allata* (a local custom of determining direction based on existing benchmarks without scientific verification).

b. Fiqh Perspective

1) Shafi'i Mazhab Analysis

The Shafi'i Mazhab emphasizes directional precision (‘ain al-ka’bah). According to Imam Nawawi in Raudhatut Thalibin, facing the Qibla means directing one's chest toward the Ka'bah. If the deviation is so significant that it can no longer be considered "facing," the prayer is invalid. The 12° deviation at the mosque clearly exceeds permissible limits, as the prayer direction leans northward (for locations south of the Ka'bah) rather than northwest. Similarly, the deviations in grave orientations are extreme and do not meet the criteria for facing the Qibla.

2) Hanafi Mazhab Analysis

The Hanafi Mazhab holds a more lenient view. They permit prayer as long as the direction falls within the general direction (jihah) of the Ka'bah—between the east and north angles of the Ka'bah (for western Indonesia) or between the west and north angles (for eastern Indonesia)—with a deviation tolerance of up to 90° from the precise direction. Thus, according to the Hanafi school, the 12° deviation at the mosque and even the 30° deviation at the graves are tolerated, as they remain within the jihah of the Ka'bah.

3) Maliki Mazhab Analysis

The Maliki Mazhab takes a moderate stance on Qibla direction. According to this school, a person is considered to have faced the Qibla if they have exerted effort (ijtihad) to determine the most accurate direction. The Maliki school sets a tolerance limit of 45° from the true direction. Therefore, based on the Maliki school, the 12° deviation at Assalam

Mosque and the deviations at the graves (21°-30°) remain within tolerance, though the 30° deviation approaches the maximum limit. However, despite the 90° tolerance, the principle of ijtihad (maximal effort) is key. In a modern context where accurate methods like Istiwa'aini and digital applications are easily accessible, the argument of having "exerted effort" using traditional methods becomes increasingly difficult to uphold.

4) Hanbali Mazhab Analysis

The Hanbali Mazhab holds a view relatively similar to the Hanafi and Maliki mazhabs. According to this school, facing the Qibla does not require precise orientation toward the Ka'bah ('ain al-ka'bah) but is sufficiently fulfilled by facing its general direction (jihah al-ka'bah). Based on this standard, the deviations at both Assalam Mosque (12°) and the cemetery (21°-30°) remain within permissible tolerance limits.

5) Comparative Analysis Between Mazhabs

Table 2. Comparison of Islamic Jurisprudence Schools' Views on Qibla Direction Tolerance

Mazhabs	Permissible Limit	Permissibility Status of 12° Deviation (Mosque)	Permissibility Status of 21°-30° Deviation (Cemetery)
Hanafi	90°	Permissible	Permissible
Maliki	90°	Permissible	Permissible
Shafi'i	0°5'38,63"	Not Permissible	Not Permissible
Hanbali	90°	Permissible	Permissible

c. Implications of the Findings

The differences in tolerance limits among the schools of thought stem from differing interpretations of the concept of 'facing the qibla.' The Hanafi, Maliki, and Hanbali schools emphasize the jihah (general direction) of the Ka'bah, which is more substantive, while the Shafi'i school emphasizes the 'ain (exact point) of the Ka'bah, which is more formal. These differences demonstrate the dynamism of ijtihad in responding to the technological limitations of the past versus the precision enabled by modern science. As for the differing scholarly opinions on whether positioning the deceased towards the qibla is obligatory or recommended, the prevailing position remains a consensus as a form of final respect and in emulation of the Prophet Muhammad (peace be upon him), making its accuracy highly prioritized.

D. Conclusion

Based on the research results and discussion, it can be concluded that there are significant Qibla direction deviations in the worship and burial facilities in Timbuseng Hamlet. The 12° deviation at Assalam Mosque and 21° to 30° deviations at grave markers indicate that the existing Qibla direction has substantially deviated from the true direction towards the Ka'bah (azimuth ~292°29').

These findings confirm that reliance on traditional methods and cultural heritage (allata) without scientific verification has led to serious inaccuracies in determining the Qibla direction at the research location.

The analysis from the converging perspectives of falak science and Islamic jurisprudence reveals a fundamental contradiction in interpreting these deviations. According to modern falak science standards (tolerance limit ±2°) and the Shafi'i School (very strict tolerance limit, < 1°), the existing Qibla direction is declared invalid and must be corrected as it exceeds permissible limits. However, according to the Hanafi, Maliki, and Hanbali Schools that apply the jihah (general direction) concept with tolerance limits up to 90°, the existing Qibla direction is still tolerated. This difference highlights the urgency for correction, particularly for followers of the Shafi'i School who constitute the majority, while simultaneously emphasizing the importance of community empowerment through falak literacy and technology transfer to ensure worship accuracy in the future.

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