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A Comparative Analysis of Qibla Direction Accuracy Using a Theodolite, Mizwala, and Right-Angle Triangle at As-Sakinah Mosque, Surabaya

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ABSTRACT

The Qibla direction is a fundamental aspect of Muslim prayer, requiring precise determination. This study evaluates the accuracy of the Qibla direction at the As-Sakinah Mosque in Surabaya by comparing three instruments: a Theodolite, a Mizwala, and a Right Triangle (Segitiga Siku-siku). Employing field experimental methods, the measurement data were analyzed using a comparative descriptive approach. The findings reveal significant variations in accuracy among the instruments: the Theodolite and Mizwala detected deviations of 5° 56' 48.71" and 5° 35' 4.21" respectively, whereas the Right Triangle method showed a substantial deviation of 25°. It is concluded that the mosque's current orientation deviates by approximately 5 degrees to the North, highlighting that digital optical instruments offer superior accuracy compared to simple manual methods in urban environments.

ARTICLE INFO

ABSTRACT

Arah kiblat merupakan aspek krusial bagi umat Islam dalam melaksanakan salat, sehingga presisinya menuntut perhatian khusus. Penelitian ini menguji akurasi arah kiblat di Masjid As-Sakinah Surabaya dengan mengkomparasikan tiga instrumen: Theodolit, Mizwala, dan Segitiga Siku-siku. Melalui metode eksperimen lapangan, hasil pengukuran dianalisis secara deskriptif komparatif. Hasil penelitian menunjukkan variasi tingkat akurasi yang signifikan antar instrumen: Theodolit mendeteksi

penyimpangan arah kiblat masjid sebesar 5° 56' 48.71" dan Mizwala sebesar 5° 35' 4.21", sedangkan metode Segitiga Siku-siku menunjukkan penyimpangan ekstrem sebesar 25°. Disimpulkan bahwa arah kiblat Masjid As-Sakinah saat ini melenceng sekitar 5 derajat ke arah Utara, di mana instrumen optik digital terbukti memberikan akurasi yang jauh lebih tinggi dibandingkan metode manual sederhana.

INTRODUCTION

Islam is the religion approved by Allah SWT and is among the largest religions in the world in terms of its number of adherents, a status achieved through the significant role of the Prophet Muhammad and earlier messengers in its dissemination. In everyday life, Islam establishes a comprehensive system of obligations that must be observed by its followers, through which corresponding rights are realized. Worship represents a central obligation in Islam and is governed by specific principles and requirements that must be fulfilled. Among the most fundamental acts of worship is the performance of *ṣalāh* (ritual prayer), which occupies a central position in Islamic religious practice.[1]

In the performance of ṣalāh, Muslims are required to observe its essential pillars and legal prescriptions, one of which is facing the Qibla. This requirement underscores the importance of accurately determining the direction of prayer. From an astronomical perspective, the Qibla is defined as the shortest path from a given location on the Earth's surface to the Kaʿbah, measured along a great circle. Meanwhile, from the Sharīʿah perspective, the Qibla refers to the direction of the Kaʿbah toward which Muslims orient themselves during the performance of prayer.[2] Given Indonesia's geographical position

[1]Mohd Hafiz Safiai et al., "Observing Sun's Altitude During Transit Using Astrolabe as a Teaching Aid in Astrofiqh," *International Journal of Academic Research in Business and Social Sciences* 13, no. 2 (February 9, 2023), https://doi.org/10.6007/IJARBSS/v13-i2/16400.

[2]Nurul Izza and Sartika Sartika, "Implementation of L-Qibla for Qibla Direction Indicators in Graves," *Astroislamica: Journal of Islamic Astronomy* 4,

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to the east of the Kaʿbah, Fatwa of the Indonesian Council of Ulama (MUI) No. 3 of 2010 states that the Qibla direction for Muslims in Indonesia generally faces west. Consequently, this understanding has led many members of the public to associate the Qibla direction with the point of sunset.[3] This circumstance indicates that the accuracy of the Qibla direction is a fundamental requirement in the performance of ṣalāh, as it directly relates to the procedural validity of the prayer. Nevertheless, in practice, many Muslim communities remain insufficiently informed about the technical aspects and measurement methods required to determine the Qibla direction accurately.[4]

The determination of the Qibla direction in mosques can be carried out using various methods, including theodolites, mizwala, right-angle triangles, and other techniques. Each method has its own strengths and limitations. The theodolite and mizwala are known to offer higher levels of accuracy; however, their use requires advanced equipment and a relatively high level of technological expertise. In contrast, the right-angle triangle method is comparatively simple and affordable, but it is more susceptible to measurement errors due to its lower degree of accuracy, which results from the inherent limitations of the method itself.[5]

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no. 1 (June 1, 2025): 142–61, https://doi.org/10.47766/ASTROISLAMICA.V4I1.3938.

[3]Cut Nazar Mutia Hanum and Ismail Ismail, "Pandangan Tokoh Agama Jungka Gajah Terhadap Arah Kiblat Bagi Orang Yang Jauh Dari Ka'bah," *Astroislamica: Journal of Islamic Astronomy* 1, no. 2 (December 28, 2022): 169–86, https://doi.org/10.47766/ASTROISLAMICA.V1I2.934.

[4]Laiyina Ukhti Santi Okta Sriani, "Uji Akurasi Arah Kiblat Menggunakan Fitur Kompas Kiblat Pada Aplikasi Quran KEMENAG Versi 2.1.4," *Astroislamica* 1, no. 2 (2022): 219, https://doi.org/https://doi.org/10.47766/astroislamica.v1i2.951.

[5]Faruk Yildirim, Fatih Kadi, and Sakir Levent Sahin, "Developing a New Interface for Qibla Direction Application Based on MATLAB GUI," *Survey Review* 57, no. 403 (July 4, 2025): 315–29, https://doi.org/10.1080/00396265.2024.2411186.

This study focuses on As-Sakinah Mosque in Surabaya as the research site, where the accuracy of the Qibla direction was systematically examined. As-Sakinah Mosque is one of the prominent mosques in Surabaya and possesses notable historical significance, making it a frequently visited place of worship. The mosque is situated within the Balai Pemuda Surabaya complex, specifically at Gubernur Suryo Street No. 11, Embong Kaliasin, Genteng District, Surabaya City. Following a major renovation in recent years, the mosque is currently in excellent condition and presents a monumental appearance. It features a modern architectural design that emphasizes comfort and functionality and is equipped with adequate facilities to support religious activities. The mosque attracts a diverse range of worshippers and visitors, including local residents, office employees, students, and tourists visiting the city.

This study aims to analyze the determination of the Qibla direction using the theodolite, mizwala, and right-angle triangle methods, and to systematically compare the accuracy and magnitude of deviation produced by each method at As-Sakinah Mosque, Alun-Alun Surabaya. The findings of this study are expected to contribute both theoretically and practically: theoretically, by providing a comparative evaluation of commonly used Qibla determination methods, and practically, by improving the accuracy of the Qibla direction at As-Sakinah Mosque and enhancing awareness among Muslims regarding the importance of accurately facing the Qibla in accordance with Islamic legal principles.

METHOD

This study is a field-based investigation employing an experimental research approach. Data were collected through three primary techniques: interviews with the head of the management board (takmir) of As-Sakinah Mosque, Surabaya; documentation of calculation results obtained from the three measurement instruments; and direct observation during the process of determining the Qibla direction at the mosque. The Qibla measurements were conducted on 30 May 2024, coinciding with the commemoration of National Qibla Day (Hari Sejuta

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Kiblat). Three instruments were utilized in this study, namely a theodolite, a mizwala, and a right-angle triangle. The measurement results produced by these instruments were systematically compared with one another and with the mosque's existing Qibla direction.

This comparative analysis enabled the identification of the magnitude of deviation between the current Qibla orientation of As-Sakinah Mosque and the direction obtained through precise measurements. The collected data were subsequently analyzed using statistical methods to test the proposed hypothesis and to derive broader conclusions.

RESULTS AND DISCUSSIONS

As Sakinah Mosque Surabaya profile

As-Sakinah Mosque is a place of worship located at Gubernur Suryo Street No. 11, Embong Kaliasin, Genteng District, Surabaya, East Java, Indonesia (postal code 60271). The mosque possesses several distinctive characteristics that make it prominent among the surrounding buildings. One of its most notable features is its highly strategic location within the Balai Pemuda area, which is more widely recognized by the public as Alun-Alun Surabaya. This area serves as a central hub of urban activity and is frequently visited by both local residents and visitors from outside the city.[6]

In addition, As-Sakinah Mosque is directly adjacent to the Surabaya Regional House of Representatives (DPRD) building, which further enhances its prominence and distinctive character. In terms of geographical coordinates, the mosque is located at 7° 15′ 48″ South Latitude and 112° 44′ 42″ East Longitude. This geographical positioning contributes to the mosque's accessibility for worshippers arriving from various parts of the city. As-Sakinah Mosque serves not only as an important place of worship for the surrounding community but is also frequently visited by non-local visitors, particularly those spending time in

[6]https://surabayapagi.com/read/gp-ansor-siap-kawal-pembangunan-masjid-as-sakinah (diakses pada 2 Juni 2024 pukul 14.15)

the Alun-Alun Surabaya area. The combination of its strategic location and proximity to key public buildings establishes As-Sakinah Mosque as a notable and significant religious landmark in Surabaya.[7]

In mid-2017, the Surabaya City Government unilaterally decided to demolish As-Sakinah Mosque. This decision was officially justified by a renovation plan intended to enlarge and expand the mosque and to integrate it architecturally with the Surabaya Regional House of Representatives (DPRD) building. Nevertheless, the decision provoked substantial public controversy, particularly among major Islamic organizations such as Nahdlatul Ulama (NU), Muhammadiyah, Ansor, and other affiliated groups. These organizations voiced concerns that the integration of As-Sakinah Mosque with the DPRD building could alter the mosque's original function. Specifically, they argued that a mosque which had previously served as a public place of worship for the wider community might be transformed into a place of worship primarily designated for members of the DPRD.[8]

After a series of controversies, the Surabaya City Government ultimately decided to proceed with the renovation of As-Sakinah Mosque at its original location. The mosque renovation project was incorporated into the broader development package of the Surabaya Regional House of Representatives (DPRD) building, with a total allocated budget of IDR 58 billion. The renovation process took approximately six months, and the mosque was reopened for public use in October 2018. Following the renovation, the new As-Sakinah Mosque occupies an area of 17 × 27 meters. The inauguration of the renovated mosque was officiated by the Mayor of Surabaya, Tri Rismaharini, who formally marked the occasion by signing a commemorative plaque. In addition to the Mayor, the

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[7]https://jatim.antaranews.com/berita/262622/masjid-as-sakinah-balai-pemuda-surabaya-siap-difungsikan-oktober (diakses pada 2 Juni 2024 pukul 14.15)

[8]https://jatim.inews.id/berita/masjid-as-sakinah-akhirnya-kembali-dibangun-lebih-luas-dan-megah (diakses pada 2 Juni 2024)

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inauguration ceremony was attended by the Chairperson of the Surabaya DPRD and its members, the Chairperson of the Indonesian Council of Ulama (MUI) of Surabaya City, representatives of the Surabaya Regional Leadership Forum, and officials from various Regional Government Organizations (OPD) within the Surabaya City Government.[9]

Results of the Qibla Direction Accuracy Test at As-Sakinah Mosque, Surabaya

The measurement of the Qibla direction at As-Sakinah Mosque was conducted on 30 May 2024 using three astronomical instruments, namely a theodolite, a mizwala, and a right-angle triangle. The measurements were carried out by positioning the instruments in the front courtyard of the mosque, a location that facilitated the drawing of the Qibla line as well as the alignment of the prayer rows (ṣaff). The detailed results of the Qibla direction measurements obtained using each instrument are presented as follows.

1. Right-Angle Triangle Method

The method of determining the Qibla direction using a right-angle triangle with the assistance of sunlight was first introduced by Slamet Hambali. This method can be applied at almost any time and in any location by individuals seeking to measure the Qibla direction. The term "any time," however, is subject to certain limitations, namely that the measurement may be conducted from sunrise to sunset, except when the Sun is close to the zenith, defined as when the angular distance between the Sun and the zenith is less than 30 degrees. Accordingly, the determination of the Qibla direction using the right-angle

[9]https://www.surabaya.go.id/id/berita/50387/peresmian-masjid-as-sakinahkom (diakses pada 2 Juni 14.15)

triangle method relies on the observation and measurement of the Sun's shadow at permissible times throughout the day.[10]

Prior to conducting the measurements, it is necessary to calculate the Qibla direction and determine the corresponding Qibla azimuth for the location under investigation.[11] The following steps were undertaken to measure the Qibla direction using a right-angle triangle and a compass:

a. The north–south direction was first determined using a compass, after which a reference line was drawn or marked using a string.
b. A 90-degree angle was then constructed from this reference line to identify the east–west direction, and a corresponding line was drawn.
c. The Qibla direction angle, calculated at 65 degrees based on the prior azimuth computation, was subsequently established.
d. A right-angle triangle was constructed with arbitrary dimensions, namely a length of 9 cm and a width determined by the cotangent of angle B, approximately 4 cm.
e. The triangle was then aligned with the predetermined Qibla direction angle, resulting in the corresponding Qibla direction line.

The measurement results indicate that the qibla direction of As-Sakinah Mosque is not aligned with the orientation of the mosque building, showing a deviation of 25 degrees. Astronomically, this deviation may be considered substantial; however, it remains within the permissible tolerance recognized by the Hanafi school of Islamic jurisprudence. Imam Abu Hanifah permits a deviation of up to 45 degrees in determining the qibla direction, based on the legal interpretation that facing the qibla encompasses the frontal orientation of the face,

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[10]Ahmad Izzuddin, *Ilmu Falak Praktis* (Semarang: Pustaka Rizki Putra, 2017).

[11]Ahmad Izzuddin, "Typology Jihatul Ka'bah on Qibla Direction of Mosques in Semarang," *Ulul Albab: Jurnal Studi Dan Penelitian Hukum Islam* 4, no. 1 (November 1, 2020): 1–15, https://doi.org/10.30659/JUA.V4I1.12186.

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including the span between the left and right temples, which geometrically corresponds to an angular range of approximately 45 degrees.[12] From this standpoint, it may be concluded that the worshippers have oriented themselves toward jihat al-Kaʿbah (the general direction of the Kaaba) rather than ʿayn al-Kaʿbah (the exact physical structure of the Kaaba). This approach is grounded in established jurisprudential principles, which hold that for individuals located at a substantial distance from the Kaaba, the obligation of facing the qibla is fulfilled by orienting oneself toward its general direction, rather than aligning precisely with the Kaaba's physical structure.[13]

1. Mizwala

Mizwala, as one of the astronomical instruments used for determining the qibla direction, is a modification of the sundial and the istiwaʾ staff. The instrument was developed in 2010 by Hendro Setyanto, an astronomer and graduate of the Bandung Institute of Technology (ITB). Historically, Mizwala has evolved through two main versions. The initial version did not utilize the angular difference between the Sun's shadow and the qibla azimuth; instead, it relied directly on the calculated qibla azimuth. The more recent version, by contrast, determines the qibla direction by calculating the angular difference between the azimuth of the Sun's shadow and the qibla azimuth.[14] The Mizwala instrument consists of several key components.

a. The level base, which serves as the main supporting structure and ensures the stability of the components mounted above it. This base is equipped with an adjustable tripod that allows precise leveling and

[12]Nur Hidayatullah el-Banjary. *Menentukan Arah Kiblat dengan Hembusan Angin (Perspektif Fikih dan Sains)*

[13]Ardana Ash Siddiqi and Friska Linia Sari, "Implementation of Cattle Grazing Positions for Determining Cardinal Directions and the Qibla Direction," *Astroislamica: Journal of Islamic Astronomy* 4, no. 1 (June 1, 2025): 180–98, https://doi.org/10.47766/ASTROISLAMICA.V4I1.3470.

[14]Siti Tatmainul Qulub. *Ilmu Falak dari Sejarah ke Teori dan Aplikasi* (Depok: Rajawali Pers, 2017) 153.

enhances overall stability during measurement.

b. The spirit level (bubble level), positioned on the level base, which is used to verify and maintain the horizontal alignment of the instrument.
c. The compass, also installed on the level base, which functions to indicate the cardinal directions and assist in the initial orientation of the instrument.
d. The rotating dial plate, which can be rotated through a full 360 degrees and functions as the surface for receiving the Sun's shadow cast by the gnomon. This dial is marked with concentric circles and an angular scale graduated at 15-degree intervals, enabling accurate angular readings.[15]
e. The gnomon, which functions as the element that casts the Sun's shadow, is positioned at the center of the circular rotating dial. It has a pointed tip, and its height is designed to be equal to the radius of the dial plate, ensuring proportional and accurate shadow projection.

The measurement of the qibla direction of Masjid As-Sakinah using the Mizwala instrument indicates that the existing orientation of the mosque is not perfectly aligned with the true qibla direction. The results reveal a deviation of 5° 35′ 4.21″, with the misalignment directed towards the north.

2. Theodolite

The theodolite is a widely used astronomical instrument in *ʿilm al-falak* for determining the qibla direction and is composed of several essential components. It is equipped with an objective lens, which is used to accurately sight the target object, and an eyepiece (ocular lens) that allows the observer to view the object with clarity. The instrument also features box and tubular spirit levels, which function to level the theodolite and ensure precise horizontal alignment, similar to a waterpass. Furthermore, the theodolite is mounted on a tripod and includes horizontal and vertical adjustment controls, as well as locking mechanisms for

[15]Muhammad Thoyfur, "DIGITALIZATION OF LOCAL RASHDUL QIBLA BY QIBLA DIAGRAM," *Al-Hilal: Journal of Islamic Astronomy* 3, no. 1 (2021), https://doi.org/10.21580/al-hilal.2021.3.1.7697.

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both axes, along with additional supporting components that enable highly accurate angular measurements.[16]

In measuring the qibla direction, several preliminary steps must be undertaken prior to the actual observation. The process begins with the preparation of the theodolite, which involves properly setting up the tripod on a stable and level surface. The levelness of the tripod is then checked using a spirit level (waterpass). Once all tripod legs are evenly balanced, the theodolite is mounted securely onto the tripod and fixed in place. Similar to the tripod, the theodolite itself is equipped with a tubular level (nivo tabung), which must be carefully adjusted to ensure precise horizontal alignment. This leveling procedure is essential to minimize potential measurement errors and to ensure the accuracy of the subsequent qibla direction calculations.[17]

The following are the procedural steps for measuring the qibla direction using a theodolite:

a. The shadow of the Sun is sighted through the objective lens using a solar filter, after which the instrument is locked in position.
b. Once locked, the horizontal circle reading is set to zero.
c. True north is then determined by calculating the solar azimuth at the exact time of observation. The solar azimuth data are obtained using the Stellarium application, after which the theodolite is locked to preserve the reference direction.

[16]Siti Tatmainul Qulub. *Ilmu Falak dari Sejarah ke Teori dan Aplikasi* (Depok: Rajawali Pers, 2017) 263.

[17]Khairul Anaam et al., "Accuracy Test of Qibla Direction of Qowiyuddin Mosque Jagir Wonokromo Surabaya," *AL - AFAQ : Jurnal Ilmu Falak Dan Astronomi* 6, no. 2 (October 29, 2024): 163–82, https://doi.org/10.20414/afaq.v6i2.10912.

Gambar 1. data azimuth matahari dari stellarium

d. After the instrument is locked, the horizontal angle is set to zero.
e. The lock is then released, and the theodolite is rotated clockwise until the horizontal angle indicates the calculated qibla azimuth. The qibla azimuth value is obtained from prior calculations performed using a prepared Microsoft Excel worksheet.

Gambar 2. data azimuth kiblat

f. The theodolite is then locked, indicating that the

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instrument is now precisely aligned with the qibla direction.

g. Two reference points are sighted using the laser, and these points are connected to form a qibla line.
h. Subsequently, a 90-degree angle is drawn from the qibla line to establish the prayer row (ṣaff) alignment.

The qibla measurement conducted using the theodolite indicates a deviation of 5° 56′ 48.71″ toward the north, which is closely consistent with the results obtained using the Mizwala instrument. This finding suggests that the observed deviation remains within the acceptable tolerance limit according to the jurisprudential perspective of Imam Abū Ḥanīfah.[18] This indicates that for Muslims who are geographically distant from the Kaʿbah, the obligation of facing the qibla does not require exact alignment with the physical structure of the Kaʿbah itself. Rather, it is sufficient to face its general direction (jihāt al-Kaʿbah), rather than the precise point (ʿayn al-Kaʿbah). This understanding represents a form of juristic ijtihād adopted by Muslims worldwide in accordance with their geographical circumstances.[19]

Analysis

As-Sakinah Mosque is situated in the Balai Pemuda area of Surabaya at the geographical coordinates of 7° 15′ 48″ South Latitude and 112° 44′ 42″ East Longitude. Balai Pemuda, widely recognized as Surabaya Town Square (Alun-Alun Surabaya),

[18]Ismail Ismail, Dikson T. Yasin, and Zulfiah, "Toleransi Pelencengan Arah Kiblat Di Indonesia Perspektif Ilmu Falak Dan Hukum Islam," *Al-Mizan* 17, no. 1 (June 30, 2021): 115–38, https://doi.org/10.30603/am.v17i1.2070.

[19]Mohamaddin Abdul Niri, Nurulhuda Ahmad Zaki, and Mohamad Luqman Hakim Mohd Nor, "ANALISIS KOMPUTASIONAL APLIKASI SUN COMPASS DALAM PENENTUAN ARAH KIBLAT MUSLIM," *Jurnal Fiqh* 20, no. 1 (June 30, 2023): 1–32, https://doi.org/10.22452/fiqh.vol20no1.1.

represents one of the city's principal public and activity centers, attracting both local residents and visitors. Accordingly, As-Sakinah Mosque occupies a strategically significant location, serving as an important place of worship for Muslims who conduct activities in and around the Surabaya Town Square area. This study employed three instruments commonly used in ʿilm al-falak to measure the qibla direction, namely the theodolite, Mizwala, and a right-angle triangle combined with a compass. Each instrument involves distinct operational procedures and technical considerations. However, in principle, qibla determination using these methods is fundamentally dependent upon accurate calculations and reference data concerning the solar azimuth and the qibla azimuth. Consequently, all required computational data must be prepared in advance to ensure procedural efficiency and to achieve a high level of measurement precision.[20]

As an alternative to manual calculation, the solar azimuth may also be determined using various applications available on digital platforms.[21] This development undoubtedly facilitates the work of contemporary falak practitioners. Nevertheless, it should be acknowledged that digital applications and even modern measuring instruments do not always provide results that are perfectly accurate in real-world conditions. In the context of qibla determination, therefore, it is essential to apply appropriate corrections to the instruments and methods employed in order to minimize potential errors arising from the calculation and measurement process.

The qibla measurements of As-Sakinah Mosque using the three methods employed in this study revealed noticeable

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[20]Muh Arif Royyani et al., "Religious Dialogue and Astronomy from the Perspective of Indonesian Muslim Scholars," *Samarah: Jurnal Hukum Keluarga Dan Hukum Islam* 7, no. 1 (March 31, 2023): 261–80, https://doi.org/10.22373/SJHK.V7I1.12406.

[21]Nurulhuda Ahmad Zaki and Damia Batrisya Hidayatullah, "Analisis Ketepatan Aplikasi Kiblat Dalam Play Store Dan Apple App Store Analysis of Qibla App Accuracy in the Play Store and Apple App Store," *Jurnal Fiqh* 22, no. 1 (June 30, 2025): 1–35, https://doi.org/10.22452/fiqh.vol22no1.1.

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differences. Measurements obtained with the Mizwala and the theodolite showed a deviation of approximately 5 degrees from the mosque's existing qibla orientation, with the deviation directed toward the north. The differences were mainly in minutes and seconds, which are considered negligible in practical terms. In contrast, the right-angle triangle method produced a much larger deviation of 25 degrees, indicating a significant discrepancy compared to the other two instruments. These results underscore the critical importance of accurately determining true north at the initial stage, particularly when using a compass. Compass readings require careful correction, as they can be affected by local magnetic interference from nearby objects or the surrounding environment, which can substantially influence the final qibla determination.

The results indicate that the compass used in the right-angle triangle method exhibits considerably lower accuracy compared to the other two falak instruments. In contrast, the theodolite demonstrated the highest level of precision among all instruments tested. This can be explained by the fact that the theodolite is a digital instrument with built-in calibration and automated settings, whereas both the right-angle triangle and Mizwala methods rely primarily on manual measurements and calculations. Nevertheless, achieving accurate results ultimately depends on the correct and careful use of each instrument, highlighting that proper methodology is as crucial as the instrument itself.

The observed deviation of approximately 5 degrees remains within the acceptable tolerance for qibla alignment. It is important to note that Muslims located far from the Kaʿbah cannot be expected to face the structure with absolute precision. In this context, the concept of jihāt al-Kaʿbah applies, indicating that it is sufficient to face the general direction of the Kaʿbah, so long as one is oriented toward it within an acceptable angular range. This approach reflects a form of ijtihād practiced by Muslims globally, adapted to their respective geographical circumstances.

CONCLUSION

As-Sakinah Mosque in Surabaya is a prominent mosque known for its historical significance and its role as a frequently visited place of worship in the city. It is located within the Balai Pemuda complex, at Jl. Gubernur Suryo No. 11, Embong Kaliasin, Genteng District, Surabaya. Following a recent renovation, the mosque now presents a well-maintained, modern, and architecturally striking structure, equipped with comprehensive facilities to support worship activities. The mosque attracts a diverse range of visitors, including local residents, office workers, students, and tourists, reflecting its importance as both a religious and community landmark in Surabaya.

The qibla measurement of As-Sakinah Mosque, Alun-Alun Surabaya, conducted on May 30, 2024, indicated a deviation of approximately 5 degrees toward the north from the mosque's existing qibla orientation. These results are understood to be influenced by the accuracy of the instruments used, highlighting that the correct and precise operation of each device is crucial for obtaining reliable and valid measurements.

It is necessary to adjust the qibla direction, particularly during the rashdul qibla, when the Sun is positioned directly above the Kaʿbah. Ideally, the alignment of the prayer rows (ṣaff) should correspond precisely to the measured qibla. However, considering practical constraints, such as the impossibility of modifying the mosque's existing structure, a feasible solution would be to slightly tilt the ṣaff lines to match the measured direction, thereby balancing both accuracy and the collective interests of the congregation.

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