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Test Of The Accuracy Of The Qibla Direction Of The Graves Of Hubbal Khaer Hall, Eyat Mayang Village Using*mizwala Qibla Finder*

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Abstract
This research is grounded in academic concern arising from the Researcher's observations regarding the qibla direction of graves in Hubbal Khaer Hamlet, Eyat Mayang Village, which are not aligned with one another. Therefore, the objectives of this study are to determine the community's understanding of how to determine the qibla direction of graves, to identify the methods used by the people of Hubbal Khaer Hamlet in determining the qibla direction, and to assess the accuracy of the qibla orientation of graves in the area.This study employs a field research design with a qualitative approach. The qualitative approach is used to reveal the facts occurring in the field related to the Accuracy Test of the Qibla Direction of Graves in Hubbal Khaer Hamlet, Eyat Mayang Village.The findings of this research show that the determination of the qibla direction of graves in Hubbal Khaer Hamlet is carried out using the method of observing the direction of the sunset, as the community in earlier times was not yet familiar with modern or advanced instruments. Another method used is relying on the opinions of religious scholars or Tuan Guru. In addition, the community also follows the orientation of previously established graves. The accuracy test conducted using the Mizwala Qibla Finder indicates that several grave orientations are inaccurately aligned. The lower graveyard shows a deviation of 45° toward the south, indicating that its qibla direction is inaccurate. Meanwhile, the upper graveyard shows a deviation of approximately 4° toward the north, indicating that its qibla direction is less accurate.

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1. INTRODUCTION

In Islam, the burial of the deceased must be directed towards the Qibla, in accordance with Islamic teachings. The Qibla refers to the direction of the Kaaba in Mecca. (Mustaqim, 2020) This is as stated in a hadith.

وَوَضْعُهُ مُسْتَقْبِلَ الْقِبْلَةِ وَاجِبٌ، كَذَا قَطَعَ بِهِ الْجُمْهُورُ .قَالُوا :فَلَوْ دُفِنَ مُسْتَدْبِرًا أَوْ مُسْتَلْقِيًا نُبِشَ وَوُجِّهَ إِلَى الْقِبْلَةِ مَا لَمْ يَتَغَيَّرْ .فَإِنْ تَغَيَّرَ لَمْ يُنْبَشْ.

Meaning: And placing the dead body facing the Qiblah is obligatory, according to the majority of scholars. They argue: "If the dead body is buried with its back to the Qiblah or lying on its back, then it must be dug up and placed facing the Qiblah as long as it has not changed. If it has changed, then it must not be dug up (An-Nawawi, n.d.).

Hadith explicitly explains that Muslims, whether living or deceased, are required to face the direction of the Qibla. namely the Kaaba. because facing the Qibla for Muslims, it is an obligation in terms of worship or facing the corpse towards the Qibla when buried. (Badrun Taman, Agusten, Siun Rohan, Katra Pramadeka, Arief Wirawan, 2023) This sharia has been in effect since the time of the Prophet Muhammad until now, and even the hadith is the primary source in establishing the obligation for Muslims to face the corpse towards the Qibla.

In Islam, the position of the body in the grave is recommended to face the Qibla (Nurhalisa, 2019). However, in practice, determining the Qibla direction for graves is often done simply based on estimates, inherited customs, or referring to the cardinal directions without accurate measurements.

The Eyat Mayang Village community is 100% Muslim, and therefore must follow the commandment of the hadith. When burying a body, it must face the direction of the Qibla. This is in accordance with Islamic law and the Indonesian Ulema Council (MUI).

The reality is that until now, the method for determining the Qibla direction for graves in Eyat Mayang Village has been. The community or gravediggers themselves still use traditional methods to determine the Qibla direction for graves, such as looking at the direction of sunset and following the Qibla direction of the previous grave. Of course, methods like this cannot be a permanent reference for the accuracy of the Qibla direction for the grave. This is because the Qibla direction is tilted and does not appear to comply with applicable regulations. Therefore, new studies and reviews are needed to improve the accuracy of the Qibla direction for graves in Eyat Mayang Village. Because facing the Qibla is fundamental in worship and burial for Muslims. (Rifqah Hijriyani1, Siti Rabi'atul Adawiyah2, 2025)

Traditional methods for determining the direction of the Qibla, as practiced by the people of Eyat Mayang Village, still require further research and testing for accuracy. This is because if one only looks at the position of the setting sun to determine the direction of the Qibla, the direction of the Qibla towards the grave will change according to the position of the setting sun. This is because the position of the sun is inconsistent and follows the geographical location of an area. (Kusmanto & Sanwasih, 2011)

Along with the development of astronomy and astronomical technology, the method of determining the direction of the Qibla has experienced significant progress. (Yanto & Izzuddin, 2025) Various modern instruments have been developed to help determine the direction of the Qibla precisely, both through computational approaches and astronomical observations. One of the instruments widely used in contemporary astronomy studies is the Mizwala Qibla Finder, a tool for determining the direction of the Qibla based on the shadow of the Sun that utilizes the principles of spherical astronomy. (Hosen & Ghafiruddin, 1837) The Mizwala Qibla Finder is considered to have a high level of accuracy, is easy to apply in the field, and has relatively minimal errors if used according to procedures.

Many academics have conducted research on the accuracy of the Qibla direction, particularly in the fields of Islamic astronomy and astronomy. However, the focus, objects of study, and instruments used in these studies indicate limitations that open up opportunities for further research. Achmad Mulyadi's research (Mulyadi, n.d.) on the accuracy of the direction of the Qibla of mosques in Pamekasan Regency using a spherical trigonometry approach shows that many mosques experience deviations in the direction of the Qibla of up to several degrees, which has an impact on deviations of hundreds of kilometers from the Kaaba. Furthermore, Mohd.'s research. Kalam Daud (Daud, 2018) and Muhammad Kamalussafi,r who studied the accuracy of

the Qibla direction of the cemetery complex in Syiah Kuala District, Banda Aceh, found that more than 90% of the graves did not comply with trigonometric rules. Research by Hosen and Eka Nurhalisa (Nurhalisa, 2019) regarding the accuracy of the Qibla direction of the cemetery in Ponteh Village, Pamekasan, showed that people generally determine the direction of the Qibla of the grave based on the taqrībī (estimated) method, namely by facing west and slightly tilted to the north. Meanwhile, the latest research by Rifqah Hijriyani et al (Rifqah Hijriyani1, Siti Rabi'atul Adawiyah2, 2025). Regarding the analysis and validation of the Qibla direction of the ancient Tolobali cemetery in Bima City, a combination of qualitative and quantitative methods with Mizwala instruments and spherical trigonometry has been used.

Although the study discusses the direction of the Qibla of the graves, there is a research gap, namely the absence of research that specifically and systematically tests the accuracy of the Qibla direction of the graves of village communities using the Mizwala Qibla Finder as the main measurement tool, and is linked to empirical conditions in the field. Research on the Accuracy Test of the Qibla Direction of Graves in Hubbal Khaer Hamlet, Eyat Mayang Village, Using the Mizwala Qibla Finder is present to fill this gap, by providing accurate empirical data, a practical astronomical approach, and a real contribution to the development of astronomy and religious practices of the community.

Given the facts on the ground regarding the geographic location and direction of the Qibla at the graves in Eyat Mayang Village, researchers were interested in conducting research on the direction of the Qibla at these graves. Therefore, it would be interesting to examine the accuracy of the Qibla direction at these graves using this tool. Mizwala Qibla Finder to support its curricula, and in accordance with the guidance of Islamic law, in this case, the researcher has chosen the title"Test of the Accuracy of the Qibla Direction of Graves in Eyat Mayang Village, Lembar District, West Lombok Regency Using Mizwala Qibla Finder."

Implementation Method

This research includes field research (*field reseach)* with a qualitative approach. The researcher used this qualitative approach to uncover the facts that occurred in the field related to the Accuracy Test of the Qibla Direction of the Cemetery in Hubbal Khaer VillageEyat Mayang Village.

2. RESULTS AND DISCUSSION

The people of Eyat Mayang Village in determining the direction of the Qibla are by following the opinions of figures who have more abilities in religious knowledge such as the Tuan Guru, because most of the people at that time in Hubbal Khaer Hamlet, Eyat Mayang Village, were still lacking in human resources and were not in touch with technology that could be used as a tool to measure the direction of the Qibla, so the people really believed in the direction of the Tuan Guru, this method is called taklid.

The second method used by the people of Eyat Mayang Village to determine the direction of the Qibla is still using traditional methods, namely by looking at the position of the sunset direction, while the sunset is in the west, not above the Kaaba, so if you use the direction of the sunset to determine the direction of the Qibla, it is certain that you will not be facing the actual Kaaba, unless you determine the direction of the Qibla using the sun, there are certain days called rashidul kiblah where the sun's journey is exactly above the Kaaba, so to determine the Qibla, you only need to look at the sunset.

Grave Name: Lower Grave
Location: Eyat Mayang Village
Qibla direction data
Measurement Date: Friday, May 12, 2023

Measurement Time: 11:20 WITA
Longitude of the Kaaba: 39° 50'
Kaaba Latitude : 21° 25'
Latitude of Eyat Mayang: -8° 45' 28.98"
Longitude of Eyat Mayang: 116° 4' 9.97"
Regional Longitude: 120°
Declination: 18° 7' 49"
Equation of Time : 0° 3' 37"
Calculation
Known data
Latitude of the Kaaba: 21˚ 25'
Longitude of the Kaaba: 39˚ 50'
Latitude of Eyat Mayang: -8° 45' 28.98"
Longitude of Eyat Mayang: 116˚ 4' 9.97"
Formula
Cotan B = (1: tan B) * sin A: sin c – Cos A *(1: tan c)

Finding the Values of A, B, C

90°- (-8° 45' 28,98") = 98° 45' 28,98"
90°- 21° 25' = 68° 35'
116° 4' 9,97"- 39° 50' = 76° 14' 9,97"

Correction of Qibla Direction of the Cemetery Below Eyat Mayang Village

Calculation and Results

Cotan B = (1: tan68 35 00) * sin A98 45 -28.98: sin c 76 14 9.97- cos 98 45 28.98*(1: tan76 14 9.97)
Tan B = 0.4364163721216
Tan B =1: 0.4364163721216
Tan B = 2.2913897458491
B = 66,42275562236
B = 66˚25' 21,92" U-B
B =23,57724437764
B = 23˚ 24'38,08" B-U
B = 293˚ 34' 38,08"
Sun Direction (General)
Cotan's formula A = tan * cos φ : sin t – sin ϕ : tan t
=tan-18˚7'49"*cos-8˚45'28,98":sin16˚50'50,3"-sin 8˚45'28,98":tan-16˚50'50,3"
Cotton AM=0˚36'4.65"
Tan Am = 1: 0˚36'4.65" Tan Am = 1˚37'45.19"
Am = 58˚27'31,53"

Sun Azimuth

In determining the sun's azimuth, it is sufficient to pay attention to the direction of the sun as shown above.
If the direction of the Sun (Am) is UT (North East), then the azimuth of the Sun = Am (result) remains constant.
If the direction of the sun (Am) is ST (South East), then the azimuth of the sun = Am + 180º
If the direction of the Sun (Am) is SB (South West), then the sun's azimuth = Abs Am + 180º
If the direction of the sun is UB, then the azimuth of the sun = 360º - Am
Because the determination of the direction of the Qibla for the graves in Eyat Mayang Village is done in the morning, so the direction of the sun is at UT (north east), the azimuth of the sun for the graves in Eyat Mayang Village remains 58˚27'45.1.9"

The Difference Between the Azimuth of the Qibla and the Sun

=293˚-58˚27'45,19"
=234˚32'14,48"

Based on the image above, researchers found that the results of measuring the direction of the Qibla at the Eyat Mayang Village Cemetery using the Mizwala Qibla Finder were inaccurate. The calculations produced by the researchers were inaccurate namely 20 graves whose direction of Qibla has a deviation of 38˚, where the actual direction of Qibla is 293° towards the Kaaba, while the direction of Qibla of the grave is 255, ° which means the direction of Qibla of the grave has deviated from the actual direction of Qibla. If we draw a straight line, then the direction of Qibla of the 20 graves is towards Botswana, which is south of the city of Mecca. While the 40 graves have a total inclination of 45˚ from the actual direction of Qibla, which is 293° towards the Kaaba while the direction of Qibla of the grave is 248°, where the direction of Qibla of the grave has deviated from the actual direction of Qibla or to the Kaaba. If we draw a straight line, then the direction of Qibla of the grave is towards Botsawana, which is south of the city of Mecca. while the other 30 graves have a total deviation of 43˚ from the actual direction of the Qibla, which is 293° from the direction of the Kaaba, while the direction of the Qibla of the grave is 250°, where the direction of the Qibla of the grave has deviated from the direction of the Qibla from the direction of the Kaaba. If we draw a straight line, then the direction of the Qibla of the grave is towards Botswana, to the south of the city of Mecca. While the other 20 graves have a total deviation of 37˚, where the direction of the Qibla of the grave has deviated from the actual direction of the Qibla, which is 293°, while the direction of the Qibla of the grave is 260°. If we draw a straight line, then the direction of the Qibla of the grave is towards Zimbabwe, a country located south of the city of Mecca.

The following researchers present the results of measuring the direction of the Qibla of the underground cemetery in Eyat Mayang Village using the Mizwala Qibla Finder tool.

No	Number of Graves	Qibla direction of graves	True Direction
1.	20 Graves	255˚	293°
2.	40 Graves	248˚	293°
3.	30 Graves	250˚	293°
4	20 Graves	260˚	293°

Correction of Qibla Direction of the Cemetery above Eyat Mayang Village

Grave Name: Lower Grave
Location: Eyat Mayang Village
Qibla direction data
Measurement Date: Friday, May 12, 2023
Measurement Time: 16:12 WITA
Longitude of the Kaaba: 39° 50'
Kaaba Latitude: 21° 25'
Latitude of Eyat Mayang: -8° 45' 28.98"
Longitude of Eyat Mayang: 116° 4' 9.97"
Regional Longitude: 120°
Declination: 18° 25' 51"
Equation of Time : 0° 3' 38"

Calculation

Known data
Latitude of the Kaaba: 21˚ 25'
Longitude of the Kaaba: 39˚ 50'
Latitude of Eyat Mayang: -8˚4′28.98″"
Longitude of Eyat Mayang: 116˚ 4' 9.97"

Formula

Cotan B = (1: tan B) * sin A: sin c – Cos A *(1: tan c)

Finding the Values of A, B, C

It is known

90- (-8 45 28,98) = 98 45 28,98
90- 21 25 = 68 35'
116 4 9,97- 39 50 = 76 14 9,97

Calculation and Results

Cotan B = (1: tan68 35 00)* sin A98 45 -28.98: sin c 76 14 9.97- cos 98 45 28.98*(1: tan76 14 9.97)
Tan B = 0.4364163721216
Tan B =1: 0.4364163721216
Tan B = 2.2913897458491
B = 66,42275562236
B = 66˚25' 21,92" U-B
B =23,57724437764
B = 23˚ 24'38,08" B-U
B = 293˚ 34' 38,08"

Calculating the Solar Time Angle

t = (WD + e – [λ^d – λ]: 15) – 12*15
=(16.12+18°25' 51"-(120˚-116˚4'9,97")):15-12)*15
=58˚46'39,57"

Sun Direction (General)

Cotan's formula A = tan * cos φ : sin t – sin ϕ : tan t
=(Tan18˚25'51"*cos-8°45'28,98": sin58˚46'39,57"-sin-8°45'28,98":tan58˚46'39,57

Cotton AM = 0˚28’38.81”
Tan Am = 1: 0˚28’38,81”
Tan Am = 2˚5’40.1”
Am =64˚28’40,8”

Sun Azimuth

In determining the sun's azimuth, it is sufficient to pay attention to the direction of the sun as shown above.

If the direction of the Sun (Am) is UT (North East), then the azimuth of the Sun = Am (result) remains constant.

If the direction of the sun (Am) is ST (South East), then the azimuth of the sun = Am + 180º

If the direction of the sun (Am) is SB (South West), then the azimuth of the sun = Abs Am + 180º

If the direction of the sun is UB, then the azimuth of the sun = 360º - Am

Because the determination of the direction of the Qibla for the upper graves in Eyat Mayang Village is done in the afternoon so the direction of the sun is at UB (north west), the azimuth of the upper graves in Eyat Mayang Village is 360˚- AM

=360˚-64˚28’40,8”
=234˚32’14,81”

Difference between Qibla and Sun Azimuth

=293˚-234˚32’14,81”
=58˚27’45,19”

Based on the results of the measurement of the Qibla direction of the Eyat Mayang Village cemetery that the researcher conducted using the Mizwala Qibla Finder tool with inaccurate criteria. Where the results of the research that the researcher conducted were 4˚ from the actual Qibla direction, which is 293°, the Qibla direction of the cemetery is 297° to the north, so that the direction of the cemetery heading to the city of Medina, which is north of the city of Mecca.

3. CONCLUSION

Based on the results of observations, interviews, and documentation that the researcher carried out as explained in the previous chapters, it can be concluded that the determination or method of determining the direction of the Qibla for the graves in Eyat Mayang Village uses 2 methods, based on the teacher's opinion, while the second is by looking at the direction of the setting sun. This is because the people of Eyat Mayang Village in ancient times did not know the modern tools used to determine the direction of the Qibla and also due to the lack of knowledge related to how to determine the direction of the Qibla of the grave so that the people of Eyat Mayang Village followed the instructions of the teacher and by looking at the direction of the setting sun.

The level of accuracy of the direction of the Qibla of the graves in Eyat Mayang Village, which researchers carried out using the Mizwala *Qibla Finder* there shows varying results regarding the inclination of the direction of the Qibla of the grave. Twenty graves have a 38° deviation from the Qibla direction, while 40 graves have a 45° deviation. Another 30 graves have a 43° deviation, and another 20 graves have a 37° deviation to the south. The upper grave has a 4° deviation to the north.

4. SUGGESTION

In essence, this research still leaves much to be desired. Therefore, it is hoped that this research can be refined by future studies using other methods, such as the Tidolit and Istiwa's methods, to improve the accuracy of the Qibla direction, which truly aligns with the direction of the Qibla toward the Kaaba, whether that be the direction of the Mosque or the Cemetery.

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