



Analysis of the Qibla Direction of the Pamekasan King's Cemetery Using the Magnetic Compass Method

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Abstract: *This research aims to determine the level of accuracy of the Qibla direction of the King's cemetery in Pamekasan using a magnetic compass measuring instrument. Using a type of field research that focuses on the Ronggo Sukowati cemetery complex and the Lenduh cemetery complex, Pamekasan. Using a qualitative descriptive approach in describing research results with data collection methods, non-participant observation techniques & free guided interview techniques. The results of this research are, firstly, the main factor in the inaccuracy of most of the Qibla directions at the Pamekasan King's cemetery because at that time Islam had just entered and developed, so that in the process of determining the direction of the Qibla for his cemetery using an approximate method. Second, after analyzing the direction of the Qibla of the King of Pamekasan's cemetery using the magnetic compass method, of the 5 cemeteries of the King of Pamekasan, it turned out that only 1 cemetery was in the direction of the Qibla, that is the cemetery of Nyi Ageng Banowati. This matters in line with the assumptions of the surrounding community.*

Keywords: *Analysis, King's Cemetery, Magnetic Compass*

Abstrak: *Analisis arah kiblat adalah mengamati posisi arah yang terletak dari seseorang menuju Ka'bah dan setiap Muslim wajib menghadapnya saat melakukan ibadah, baik sholat maupun menguburkan jenazah. Permasalahan muncul ketika penentuan arah kiblat pada masa lampau, karena teknologi yang belum memadai, termasuk yang terjadi pada arah kiblat pemakaman raja Pamekasan. Masyarakat setempat menilai empat dari lima arah kiblat pemakaman Raja Pamekasan kurang tepat. Pada penelitian ini mengangkat rumusan masalah yaitu faktor ketidaktepatan arah kiblat pemakaman Raja Pamekasan dan bagaimana analisis arah kiblat pemakaman Raja Pamekasan dengan menggunakan metode kompas magnetik. Penelitian ini menggunakan jenis penelitian lapangan yang berfokus pada komplek pemakaman Ronggo Sukowati dan komplek pemakaman Lenduh, Pamekasan. Menggunakan jenis pendekatan deskriptif kualitatif dalam mendeskripsikan hasil penelitian dengan analisis menggunakan metode kompas magnetik. Hasil dari penelitian ini, pertama, faktor utama terjadinya ketidaktepatan sebagian besar arah kiblat Pemakaman Raja Pamekasan karena disebabkan pada masa itu Islam baru masuk dan berkembang, sehingga dalam proses penentuan arah kiblat pemakamannya menggunakan cara perkiraan. Kedua, setelah menganalisis arah kiblat pemakaman Raja Pamekasan menggunakan metode kompas magnetik, dari 5 pemakaman Raja Pamekasan, ternyata hanya 1 pemakaman yang mengarah ke arah kiblat yakni pemakaman Nyi Ageng Banowati. Hal ini selaras dengan asumsi masyarakat sekitar.*

Kata Kunci: *Analisis, Pemakaman Raja, Kompas Magnetik*

A. Introduction

Ilmu falak according to etymology consists of two words 'ilm and *falak* or *al-falak*. 'Ilm means *al-ma'rifah*, specifically knowledge, whereas *falak* or *al-falak* means *al-madaar*, that is orbit, line/place of travel of stars.¹ So it can be understood *lughawi* that *ilmu falak* is the science of orbits, orbits, where stars and planets circulate. As for *ilmu falak*, according to *istilahi* (terminology) is the science or study of the trajectory of objects heavenly bodies, such as the sun, moon, stars, and heavenly bodies others, aimed at finding out the position of other celestial bodies, these are mentioned in English *practical astronomy*.

¹Moh. Murtadho, *Ilmu Falak Praktis*, (Malang, Cet 1: UIN-Malang Press, 2008), 1



The word "*falak*" is expressed by the Qur'an twice in surah Al-Anbiya' verse 33 and surah Yasin verse 40. Each verse can be interpreted as a circular line or orbit.² From the several definitions outlined above, it can be drawn that the discussion and object of study of *ilmu falak* cannot be separated from celestial bodies, both in the physical form of the objects and their movements as well as the regular relationships between one celestial body and another celestial body.

Ilmu *falak* is the science that studies the trajectories of celestial bodies, especially the earth, moon, and sun in their respective orbits, to obtain phenomena for the benefit of humans, especially Muslims in determining times related to worship (*ibadah mahdhah*).³

Burying the deceased is the final process of *fardhu kifayah* for someone who has died.⁴ The Qur'an mentions the word *al-qiblah* as many as 6 mentions which are all found in surah al-Baqarah (2) verses 142–145. In terms of language, this word is taken from the root word *qabala-yaqbulu-qiblata* which means "facing".

In Islamic Fiqh, facing the direction of the Qibla is a specific issue. Someone could be said to be facing the direction of the Qibla if all parts of the person's body or parts are facing the direction of the Qibla/Ka'bah in Mekah. Likewise, when cemetery of the corpse, efforts are made to position its face towards the direction of the Qibla. The consensus of the Ulama is that facing the body towards the Qibla when being buried is a legal *fardhu*.

Suppose it is withdrawn, in terms of determining the direction of the cemetery Qibla. On average, people still follow the examples set by clerics that fundamentally influence society. The public assumes that the direction of the cemetery Qibla position determined by the previous cleric is correct and continues to this day and continues to be used as a benchmark. Even though the benchmarks used are no longer appropriate for the geological conditions in the local area. It could be that the shifting of the earth's plates causes the direction that has been determined long ago to deviate from the proper Qibla direction.

The disadvantage is, if people only understand the application of the direction of the Qibla that already existed before, but without knowing the beginning of the measurement from the start so that this application occurs. The majority of residents prefer the easy and fast method, so people choose to determine the Qibla direction based on pre-existing cemeteries.

Residents must know the procedures for determining the direction of the Qibla by applying existing measurement methods. This can be overcome if the earth's plates shift and resulting in a shift in the position of the cemetery Qibla. By continuously using the old method of determining the Qibla direction, there is concern that there will be a shift in the position of the Qibla direction. Apart from that, the factor of people's ignorance regarding the method of determining the position of the Qibla direction of a cemetery, both using the old and new methods, has resulted in a deviation from the position of the Qibla direction.

²Susiknan Azhari, *Ilmu Falak Perjumpaan Khazanah Islam dan Sains Modern*, (Yogyakarta, Cet 2 : Suara Muhammadiyah, 2007), 1.

³Watni Marpaung, *Pengantar Ilmu Falak*, (Jakarta, Cet 1: Prenada Media, 2015), 3.

⁴ Sutomo Abu Nasr, *Pengantar Fiqh jenazah*, (Jakarta: Rumah Fiqh Publishing, 2018), 38.



In Indonesia, public cemeteries are something to pay attention to. This is because Indonesia has the largest Muslim majority population in the world, where most Islamic jurisprudence explains that the Qibla is the most important reference for Muslims in worship.

It is suspected that there is a problem of lack of accuracy in the direction of the Qibla at the cemeteries place of the King of Pamekasan which was created before Islamic civilization expanded into the Pamekasan area, so it is feared that using an estimation system and frequent earthquakes caused the position of the King of Pamekasan's cemetery to deviate from the direction of the Qibla.⁵ This factor is one of the reasons the author conducted this research. After taking the initial data using the Sun & Moon Calendar application, it turns out that of the 5 cemeteries of the King of Pamekasan, there is only 1 cemetery with the correct Qibla direction, that is the Nyi Ageng Banowati cemetery with a position of 293° entering the Qibla direction area.

The following are field research sample data related to the results of the cemetery direction of the King of Pamekasan using initial data from the Sun & Moon Calendar application: 1. Ki Wonorono = 290° (more towards the south of the Qibla) 2. Nyi Ageng Banowati = 293° (directing towards the Qibla) 3. Ki Adipati Pramono = 283° (more towards the south of the Qibla) 4. Prince Nugroho/ Raja Pemelling = 283° (more towards the south of the Qibla) 5. Prince Arya Sena/ Ronggosukowati = 270° (more towards the south of the Qibla).

Among the 5 Kings of Pamekasan, it turns out that their cemeteries are in two different cemetery places, that is in the Ronggosukowati cemetery complex (only Ronggosukowati's grave is buried in this cemetery complex which is located at Jl. K.H Agus Salim, Kel. Kolpajung, Kec. Pamekasan, Pamekasan Regency) & is located in the Lenduh cemetery complex (the four Pamekasan kings are buried in this cemetery complex which is region at Lawangan Daya, Pademawu District, Pamekasan Regency).

After obtaining the results of interviews with informants, it turned out that several factors caused the accuracy of the Qibla direction of the cemetery to be skewed because at that time Islam had just entered and developed and the funeral process used approximate methods so that the accuracy of the Qibla direction for King Pamekasan's cemetery was deviated. Indeed, there is the king's cemetery the points toward the Qibla among the other 4, most likely pointing towards the Qibla due to coincidence.

This research focuses on the scope of the Cemetery of the Kings of Pamekasan which consists of Ki Wonorono (Jujuk of Prince Ronggo Sukowati), Nyi Ageng Banowati (Putri Ki Wonorono/ Grandmother of Prince Ronggosukowati), Ki Adipati Pramono (Ki Demang Plakaran II/ Grandmother Prince Ronggosukowati), Prince Nugroho/ Raja Pamellangan (Panebahan Bonorogo Buju' Lenduh/ Father of Prince Ronggosukowati), & the last one is Prince Arya Sena (Prince Ronggosukowati). Therefore, starting from the uncertainty about the Qibla direction of the King's Cemetery in Pamekasan is necessary Presumably research will be carried out regarding the accuracy of the Qibla direction of the Pamekasan Kings Cemetery

⁵ Ayek, Madurese Historian, Live Interview at Rumah Budaya, (8 December 2021).



using the magnetic compass method. This research aims to determine the accuracy of the Qibla direction of the King's cemetery in Pamekasan using a magnetic compass to obtain certainty about the accuracy of the Qibla direction of the King's cemetery ground in Pamekasan.

B. Research Methods

The type of research used in this research is empirical legal research or *field research*, that is research in the field which is a real event in society, where this research was carried out at the Ronggo Sukowati cemetery complex which is located on Jl. Agus Salim, Kopajung Village, Pamekasan, and Lenduh cemetery complex located on Jl. Stadium, Lawangan Daya Village, Pademawu District, Pamekasan.

The type of approach used in this research is descriptive research *qualitative*, where this is a research method based on the philosophy of postpositivism used to research the conditions of natural objects (as opposed to experiments) where the researcher is the key instrument in research which is descriptive and tends to use analysis. Process and meaning are more emphasized in qualitative research. The theoretical basis is used as a guide so that the research focuses on the facts in the field.

The data collection method uses non-participant observation data collection methods. The researcher only observes the object to be studied concerning the direction of the Qibla of King Pamekasan's cemetery. The location of the King of Pamekasan's cemetery itself is on two cemetery complexes, that is the Ronggosukowati cemetery & the Lenduh cemetery. The researchers use research steps with research tools, specifically the sun & moon calendar application. This research also uses free-guided interview interview techniques. Researchers looked for information regarding the cemetery of Kings in Pamekasan, then looked for informants and met a Madurese historian. He gave directions regarding the whereabouts of the Pamekasan king's cemetery. In this research, the researcher obtained an informant as a historian, that is Mr. Ayek Mayapada.

C. Results and Discussion

1. Determining the Qibla Direction for the King of Pamekasan's Funeral

From a historical perspective, astronomy can be interpreted as a science based on the results of observations & investigations of celestial objects. This science, which is previously often called astrology, was born and developed rapidly over time.⁶

In discussing the research on determining the direction of the Qibla for King Pamekasan's funeral, to determine the position of the direction of the cemetery Qibla using the magnetic compass method. The first step that must be known first is how to determine the direction of the Qibla for King Pamekasan's funeral which has been determined previously.

In general, many people don't know about the King of Pamekasan's funeral that the King of Pamekasan is and where the King of Pamekasan's cemetery is located. The first step for the

⁶ Abdul. Salam, *Practical Astrology*, (UIN Sunan Ampel Surabaya), 6.



researchers is to try to find out what the Kings of Pamekasan are and where the cemetery of the Kings of Pamekasan is located.

After this research, data on the cemetery of the Kings of Pamekasan have been collected. It turns out that the cemetery of the King of Pamekasan was in two different places, that is the Ronggosukowati cemetery & the Lenduh cemetery. The location of Ronggosukowati cemetery is located on Jl. K.H. Agus Salim, Ex. Kolpajung, District. Pamekasan, Pamekasan Regency. Meanwhile, Lenduh's cemetery location is located on Jl. Lawan Daya, Kel. Lawan Daya, District. Pademawu, Pamekasan Regency.

For the Kings of Pamekasan, it can be seen that there are 5 Kings of Pamekasan. The following are the names of the Kings of Pamekasan, including Ki Wonorono, Nyi Ageng Banowati, Ki Adipati Pramono, Pangeran Nugroho (Raja Pamellungan), Prince Arya Sena (Ronggosukowati).

The reason researchers will examine the Qibla direction of King Pamekasan's cemetery is because in general, many funerals underestimate the direction of the Qibla. The researcher was very interested in examining the position of the cemetery's Qibla direction & one other factor because at that time the researcher was looking at cemeteries whose positions were not the same, some were more inclined towards the south of the Qibla & some were more inclined towards the north of the Qibla.

This is the main factor for researchers carrying out this research. Apart from that, the other factor that makes researchers interested, in other word the cemetery of the King of Pamekasan. Because according to researchers, many ordinary people do not know what the Kings of Pamekasan are. Meanwhile, the magnetic compass is a method that researchers think is accurate & easy to research. Therefore, interested researchers will carry out this research with the title "Analysis of the Qibla Direction of the Pamekasan King's Funeral Using the Magnetic Compass Method"

The researcher's first step after obtaining the observation results was to seek the opinions of the informants. Where the researchers got 4 informants, that is a Madurese historian, a cemetery guard, a Kolpajung village head, and Lawangan Daya village head. Several opinions can be concluded after conducting interviews with the informants.

The fact that deviating factor in the direction of the Qibla direction of King Pamekasan's cemetery was caused by the renovation of the cemetery so it was feared that it would affect the position of the Qibla direction of King Pamekasan's cemetery and Islamic civilization (especially the science of astronomy) at that time was still not developed in Madura so it was feared that the cemetery used an estimation system as well as the frequency of earthquakes at that time. it can also influence changes in the position of the Qibla direction of King Pamekasan's cemetery.

According to historians, determining the direction of the Qibla for King Pamekasan's cemetery at that time was because the Islamic civilization had just entered the Pamekasan area and determining the direction of the Qibla for King Pamekasan's cemetery using an approximate method which resulted in the position of the cemetery Raja Pamekasan deviated



or, more precisely, headed south from the direction of the Qibla.

According to the caretaker of the Pamekasan King's cemetery, this was related to the direction of the Qibla of the Pamekasan King's cemetery, apart from the lack of knowledge of the Islamic religion at that time because Islamic civilization had just entered Pamekasan at that time. There is also the factor of changing the direction of the Qibla of the King's cemetery, that is due to the frequent occurrence of earthquakes in the past at the King of Pamekasan's cemetery, so the position of the direction of the Qibla of King Pamekasan's cemetery at that time may have changed.

In that year the science of astronomy had not yet developed, especially in Madura. The science of astronomy was not developed at that time, but rather used approximate methods/feeling This resulted in the position of the direction of King Pamekasan's cemetery qibla being deviated.

With the development of science to date, it is easy to determine the direction of the Qibla. There are various ways to measure the Qibla direction, that are including measures of the Qibla direction of mosques, graves, etc. Here researchers will examine the direction of the Qibla of King Pamekasan's cemetery with the magnetic compass method which will use the Sun & Moon Calendar 2D Compass tool/application.

2. Analysis of the Qibla Direction of the Pamekasan King's Cemetery Using Magnetic Compass

Qibla direction analysis is observing the position of the direction that lies from a person towards the Kaaba and every Muslim must face it when performing worship, both prayer and burying the body.

A cemetery is a plot of land that will be provided for graves. Funerals can be general & special, for example, King's cemeteries, religious cemeteries, private family cemeteries, heroes' graves and so on.

So, before making observations, the researcher has collected data regarding the location, position, and informants that will be studied. When conducting research. Researchers look at the building or condition of the cemetery The Pamekasan King looks slanted or not straight. Based on these results, researchers took the initiative to carry out measurements.

By referring to the equatorial coordinates, places on the earth's surface are determined by measuring the latitude & longitude of the place.⁷ At this stage, before continuing the calculation using the Qibla azimuth formula, the researcher should explain what the latitude and longitude of a place are:

a. Place Latitude

The latitude of a place is the distance along the longitude line, starting from the equator to the point where the line of longitude intersects with the circle of latitude of the place concerned.

b. Longitude of Place

⁷ Salam, *Ilmu Falak Praktis*, 33



The longitude of a place is the distance along the latitude circle starting from the point of intersection with the Greenwich line to the point of intersection with the longitude of the place concerned.

We need to learn how to calculate using the Qibla synth azimuth. There are steps or procedures for calculating the azimuth of the Qibla synth for the Pamekasan area. The following is the calculation procedure using the azimuth syathr Qibla formula for the Pamekasan area:

$$\Lambda_k \quad (\text{Longitude Ka'bah}) = 39^\circ 49' 40.39'' \text{ BT}$$

$$\Phi_k \quad (\text{Latitude Ka'bah}) = 21^\circ 25' 14.7'' \text{ LU}$$

$$\Lambda_t \quad (\text{Longitude of Place}) = 113^\circ 30' 16.90'' \text{ BT (+)}$$

$$\Phi_t \quad (\text{Latitude of Place}) = 07^\circ 03' 57.83'' \text{ LS (-)}$$

$$C = 320^\circ 10' 19.61'' + \lambda_t$$

$$C = 320^\circ 10' 19.61'' + 113^\circ 30' 16.90''$$

$$C = 433^\circ 40' 36.5'' \text{ (because over } 360^\circ, \text{ then subtract } 360 \text{ first}^\circ \text{ karena lebih dari } 360^\circ) \\ = 433^\circ 40' 36.5'' - 360^\circ = 73^\circ 40' 36.5''$$

$$\text{Jadi nilai } C = 73^\circ 40' 36.5''$$

$$h = \sin^{-1}(\sin \phi_t \times \sin \phi_k + \cos \phi_t \times \cos \phi_k \times \cos C)$$

$$h = \sin^{-1}((\sin -7^\circ 3' 57.83'' \times \cos 21^\circ 25' 14.7'') + (\cos -7^\circ 3' 57.83'' \times \cos 21^\circ 25' 14.7'' \times \cos 73^\circ 40' 36.5''))$$

$$\text{So value } h = 12^\circ 23' 58.34''$$

$$Q = \cos^{-1}(-\tan \phi_t \times \tan h + \sin \phi_k : \cos \phi_t : \cos h)$$

$$Q = \cos^{-1}((- \tan -7^\circ 3' 57.83'' \times \tan 12^\circ 23' 58.34'') + (\sin 21^\circ 25' 14.7'' : \cos -7^\circ 3' 57.83'' : \cos 12^\circ 23' 58.34''))$$

$$Q = 66^\circ 10' 6.11''$$

If $C > 180^\circ$, then Qibla Azimuth = Q

If $C < 180^\circ$, then Qibla Azimuth = $360 - Q$

Because of value $C = (73^\circ 40' 36.5'') < 180$, then the *syathr* azimuth of the Qibla = $360 - Q$

$$= 360 - 66^\circ 10' 6.11''$$

$$= 293^\circ 49' 53.8'' \text{ UTSB}$$

The Azimuth Syathr Qibla of Pamekasan is **$293^\circ 49' 53.8''$ UTSB** (calculated from North, East, South, and West), pointing to the west point slightly to the north around $23^\circ 49' 53.8''$.

The following are the results of the data that researchers have obtained from research at the Ronggosukowati cemetery complex & Lenduh cemetery complex:

- Ki Wonorono = 290° (more towards the south of the Qibla)
- Nyi Ageng Banowati = 293° (pointing towards the Qibla)
- Ki Adipati Pramono = 283° (more towards the south of the Qibla)
- Prince Nugroho/ Raja Pemellengan = 283° (more towards the south of the Qibla)
- Prince Arya Sena/ Ronggosukowati = 270° (more towards the south of the Qibla).



No	Names of Kings Pamekasan	Calculation Results After Using a Magnetic Compass	Information
1.	To Wonorono	290°	Less leads to north of Qibla 3°
2.	Nyi Ageng Banowati	293°	Leads to qibla
3.	Ki Adipati Pramono	283°	Less leads to north of Qibla 10°
4.	Prince Nugroho (King of Pamelligan)	283°	Less leads to north of Qibla 10°
5.	Prince Arya Sena (Ronggosukowati)	270°	Less leads to north of the Qibla 23° or more leads to westward position.

Based on the 5 cemeteries of the King of Pamekasan above, it turns out that only one cemetery leads to the direction of the Qibla, that is the cemetery of Nyi Ageng Banowati. After the informant searched for data regarding the origins of King Pamekasan's cemetery at that time, it turned out that several factors were causing the deviation in the accuracy of the Qibla direction of King Pamekasan's cemetery because at that time Islam had just entered and developed and in the funeral process using approximate methods so that the accuracy of the Qibla direction of the King's cemetery Pamekasan is off the mark. Indeed, there is 1 King's cemetery that points towards the Qibla among the other 4, most likely pointing towards the Qibla due to coincidence.

Therefore, the funerals of the Pamekasan Kings that have been researched do not need to be changed/justified. However, this can be a guide for future funerals so that when deciding the position of the funeral Qibla direction for someone who has died can be carried out carefully and carefully so that there is no deviation from the position of the funeral Qibla direction from the actual Qibla direction position.



D. Conclusion

Determining the direction of the Qibla for King Pamekasan's cemetery, the main factor was renovations which were feared to affect the position of the direction of Qibla for King Pamekasan's cemetery and Islamic civilization (especially astronomy) at that time was still not developed in Madura so it was feared that the cemetery would use an estimation system as well as the frequent earthquakes at that time. It is feared that it could affect changes in the position of the direction of the Qibla of King Pamekasan's cemetery.

After analyzing the Qibla direction of King Pamekasan's cemetery using the magnetic compass method. In the research that has been researched by this researcher, the results obtained were that the position of the tomb's Qibla direction was correctly towards the Qibla direction position & some were deviated from the Qibla direction by calculating the Qibla azimuth used by the researcher and using the magnetic compass method. Results of measuring the Qibla direction using the Compass method Magnetically, of the 5 cemeteries of the King of Pamekasan, there is only 1 cemetery that faces the direction of the Qibla, that is the cemetery of Nyi Ageng Banowati, which is most likely due to coincidence.

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