

## THE ACCURATION OF NUR MURTAJI MOSQUE QIBLA DIRECTION AT BINTAN REGENCY RIAU ISLANDS PROVINCE

*(Ketepatan Arah Kiblat Masjid Nur Murtaji di Kabupaten Bintan Provinsi  
Kepulauan Riau)*

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### ABSTRACT

From 2019 until 2020, 30 calibrations of the qibla direction of mosques in Bintan Regency have been calibrated. In 2021, the author also carried out three calibrations of the qibla direction of mosques in Bintan Regency and Tanjungpinang City. From three activities for calibrating the mosque's qibla direction, there was one mosque that deviated slightly from the qibla direction, because the construction of the mosque used a smartphone compass application in determining the qibla direction. The calibration of the qibla direction occurred due to the lack of knowledge from the mosque residents about the qibla direction, like about how to measure the qibla direction and tools that become the standard in measuring the qibla direction. Because there is a lot of qibla direction calibration, the author calibrated the Nur Murtaji Mosque qibla direction to determine the accuracy of Nur Murtaji Mosque qibla direction. This study used comparative analysis techniques, namely by comparing the previous and the current measurement of Nur Murtaji Mosque qibla direction. From the calculations, it was known that the qibla direction was  $293^{\circ} 02' 48.06''$  NESW (North-East-South-West). The qibla direction of the Nur Murtaji Mosque was accurate because there was no deviation that occurred after comparison.

**Keywords:** Accuration; qibla; Nur Murtaji Mosque

## ABSTRAK

Dari tahun 2019 hingga tahun 2020 sudah dilakukan 30 kalibrasi arah kiblat masjid di Kabupaten Bintan. Pada tahun 2021, penulis juga telah melakukan tiga kalibrasi arah kiblat masjid di Kabupaten Bintan dan Kota Tanjungpinang. Dari ketiga-tiga kegiatan kalibrasi arah kiblat masjid tersebut, terdapat satu masjid yang menyimpang sedikit arah kiblatnya, kerana pembangunan masjid menggunakan aplikasi kompas telefon pintar dalam penentuan arah kiblatnya. Kalibrasi arah kiblat masjid terjadi kerana kurangnya pengetahuan para warga masjid tentang arah kiblat, baik itu tentang cara mengukur arah kiblat serta alat yang menjadi piawaian dalam pengukuran arah kiblat. Ini kerana banyak terjadi kalibrasi arah kiblat, maka penulis melakukan kalibrasi arah kiblat Masjid Nur Murtaji untuk mengetahui ketepatan arah kiblat masjid tersebut. Penelitian ini menggunakan teknik analisis komparatif, yakni dengan membandingkan kaedah penentuan arah kiblat Masjid Nur Murtaji sebelumnya dengan kaedah penentuan arah kiblat pada ketika ini. Dari perhitungan yang dilakukan maka diketahui bahawa arah kiblat Masjid Nur Murtaji adalah  $293^{\circ} 02' 48.06''$  UTSB (Utara–Timur–Selatan–Barat). Arah kiblat Masjid Nur Murtaji adalah tepat, kerana tidak terdapat penyimpangan yang terjadi setelah dilakukan perbandingan.

**Kata kunci:** Ketepatan; kiblat; Masjid Nur Murtaji

## INTRODUCTION

The word qibla comes from the Arabic language which means facing (Munawir 1997). While the word qibla in the Al-Quran Al-Karim has two meanings, the first has the meaning of direction *qiblah* and the second means the place of prayer (Izzuddin 2006). Qibla can also be defined as the building of the Ka'bah or the direction that Muslims are going in carrying out some worships (Dahlan 1996). Qibla can also be interpreted as the closest direction or distance along the large circle that passes to the Ka'bah (Mecca) with that city (Khazin 2004). Qibla is the direction towards the Ka'bah in Mecca and every Muslim who will pray is required to turn his body in that direction. Wherever he is when he prays, he must face the qibla. The obligation to face the qibla- is based on the word of Allah SWT in Surah al-Baqarah verse 144 (Departemen Agama RI 2005) :

فَدَرَى تَقُوبَ وَجْهَكَ فِي السَّمَاوَاتِ فَلَنُؤَيِّنَنَّكَ قِبْلَةً تَرْضَاهَا فَوَلِّ وَجْهَكَ  
شَطْرَ الْمَسْجِدِ الْحَرَامِ وَحَيْثُ مَا كُنْتُمْ فَوَلُّوا وُجُوهَكُمْ شَطْرَهُ وَإِنَّ الَّذِينَ أُوتُوا  
الْكِتَابَ لَيَعْلَمُونَ أَنَّهُ الْحَقُّ مِنْ رَبِّهِمْ وَمَا اللَّهُ بِغَفِيلٍ عَمَّا يَعْمَلُونَ

Muslim communities face difficulty to determine the Qiblah direction whenever they want to perform their prayer when there is no direction provided at certain places (Sameon et al. 2014). In the old days, people used a stick and see its shadow to know the prayer times and Qibla direction. Nowadays, research and findings in astronomy help much in computing the prayer time and qibla direction using technology (Ibrahim & Norashikin 2009). Before a person wants to pray, he must first complete the conditions, both the obligatory and the legal conditions. One of them is to be sure and aware that the qibla direction is correct (Romdhon & M. Arbisora Angkat 2021).

Qibla direction is very important for Muslims because it determines the validity of the prayer (Izzuddin 2010). While the mecca of prayer for Muslims is the Ka'bah which is in the city of Mecca as mentioned in the Qur'an Surah al-Baqarah verse 144 (Jaya 2017). Ulama agree with the law of those who see the Ka'bah, it is obligatory for him to face it with full confidence *ainul ka'bah*. As for those who cannot see the Ka'bah, ulama have different understandings. The opinion of the Shafi'iyah group is that every Muslim who does not see the Ka'bah directly is still obliged to face the Ka'bah as is required for those who see the Ka'bah directly. Others argue that it is enough to face the direction of the Ka'bah *jihatul ka'bah* so that the direction of qibla here is only an assumption (Arkanuddin 2008).

Regardless of the various opinions above, wherever you are, in the north, south, west or east, the qibla direction must be to the Ka'bah. Indonesia is on the east side of the Ka'bah, so every prayer will lead to the west, but not entirely to the west because it depends on each region. While the direction of the qibla of each region is not exactly the same, the difference in the location of places of worship, whether prayer rooms, *surau* or mosques, of course also differs in the direction of the qibla. Therefore, to facilitate and assist Muslims in facing the qibla direction, the contribution of Falak (Islamic Astronomy) is very much needed in this regard, related to the long distance between the Ka'bah and Indonesia which causes many prayer rooms, *surau* or mosques that are not properly facing the qibla direction (Angkat 2016).

According to the statement from the Ministry of Religion at Bintan, every year, there are always requests for calibration of the qibla of mosques and prayer rooms. In 2019, 20 qibla calibrations were carried out for mosques in Bintan, namely, six school's *musolla*, two Islamic boarding schools's *mushalla*, one office's *mushalla*, seven *mushalla* in the community, four mosques, and one location at the RIA Bintan Golf Club Lagoi Hotel. One calibration location for measuring the qibla direction at the RIA Hotel consists of measuring the Qibla direction for each hotel room, mosque, prayer room for rest, and prayer room for male and female employees. Meanwhile,

in 2020, there were 10 locations where qibla calibration was carried out, including the two houses of worship, the Great Mosque of Mantang Sub-district, which was located on Jalan Lapangan Bola, Mantang Village and the prayer room of the Mantang Sub-District Office (Angkat & Rizki Pradana Hidayatullah Hidayatullah 2021). Based on this, it can be identified that the objects for determining the qibla direction are not only public places of worship, but also have become a necessity for certain locations such as restaurants, rest areas and hotels. This means that the acquisition of the qibla direction in public spaces is very important so that Muslims will be more comfortable in worshipping (Budiwati 2018).

In 2021, the author carried out three calibrations of the qibla direction of mosques in Bintan Regency and Tanjungpinang City. From three mosque qibla direction calibration activities, there was one mosque that deviated slightly from its qibla direction, because at the beginning of the construction of the mosque used a compass application on a smartphone in determining the qibla direction. The calibration of the qibla direction of the mosque occurred due to the lack of knowledge of the residents of the mosque about the qibla direction, both about how to measure the qibla direction and tools that become the standard in measuring the qibla direction.

Based on that, it is necessary to calibrate the qibla direction of mosques in a sustainable manner in Bintan Regency to determine the accuracy of the qibla direction of mosques in Bintan Regency, especially the accuracy of the qibla direction of the Nur Murtaji Mosque at Bintan Regency, Riau Islands Province. This mosque qibla direction calibration activity aimed to strengthen the confidence of the residents of Nur Murtaji Mosque at Bintan Regency, Riau Islands Province in praying.

## **METHODOLOGY**

This study used a type of field research to examine the qibla direction of Nur Murtaji Mosque at this time as the background of the research title that will be discussed (Suryabrata 1997). In this case, it can be seen the qibla direction of Nur Murtaji Mosque. In this study, primary data was obtained from the calculation of the qibla direction of the Nur Murtaji Mosque using the Qibla azimuth method with Theodolite. Secondary data was obtained from interviews and several documents such as books, articles, and scientific works published in media (Arikunto 2002).

After the data was collected, then processed the data and analysis the data. In analyzing the data, the author used comparative analysis techniques, namely by comparing the previous measurement and the current measurement of Nur Murtaji Mosque qibla direction.

## RESULTS AND DISCUSSION

Nur Murtaji Mosque is a mosque located within Idris Bintan Islamic Boarding School's environment. Idris Bintan Islamic Boarding School is an Islamic boarding school founded by Da'i in the Riau Islands under the auspices of Al Idris Foundation Riau Islands. Nur Murtaji Mosque is located on Wisata Bahari Street, Jeropet Kawal Village, Bintan Regency, Riau Islands Province. Nur Murtaji Mosque is one of the facilities owned by the Idris Bintan Islamic Boarding School to support the worship activities of students and residents of Islamic boarding schools (Angkat et al. 2022).

The author suspected that the determination of the Qibla direction of the Nur Murtaji Mosque used the Rashdul Kiblat method (the event of the sun passing over the Ka'bah or *istiwa' a'zam*) (Butar-Butar 2018). However, after interviews with resource persons regarding the method of determining the qibla direction of the Nur Murtaji Mosque, it was known that the method of determining the qibla direction of the Nur Murtaji Mosque using the Qibla azimuth method with Theodolite instrument carried out by Ministry of Religion at Bintan. The measurement of the mosque qibla direction was carried out in 2019, but there was no qibla azimuth data provided by the Ministry of Religion at Bintan to the Nur Murtaji Mosque as a form of documentation. Therefore the author wanted to calibrate the qibla direction to find out the qibla azimuth data of Nur Murtaji Mosque.

Before calibrating the qibla direction of Nur Murtaji Mosque, it was necessary to first calculate the qibla direction using a calculator. Qibla direction calculation was carried out to find out the qibla azimuth of a place, namely the qibla azimuth of Nur Murtaji Mosque. To find out the qibla azimuth of the Nur Murtaji Mosque, it took latitude and longitude data for the place to be calculated for the qibla direction as well as latitude and longitude data for the Ka'bah. The latitude and longitude data of the Nur Murtaji Mosque was obtained using Global Positioning System (GPS). GPS is now generally used during field investigations for obtaining precise locations but more importantly, it has been employed to determine plate movements (Dubey 2014). The data are as follows:

- Mosque's Latitude :  $00^{\circ} 59' 02.18''$  North Latitude
- Mosque's Longitude :  $104^{\circ} 37' 36.9''$  East Longitude
- Ka'bah's Latitude :  $21^{\circ} 25' 14.70''$  South Latitude
- Ka'bah's Longitude :  $39^{\circ} 49' 40''$  East Longitude
- Longitude Difference :  $104^{\circ} 37' 36.9'' - 39^{\circ} 49' 40'' = 64^{\circ} 47' 56.9''$

After the latitude and longitude data were known, then the data were entered into the qibla azimuth formula. The formula is as follows:

$$\text{Cotan B} = \frac{\text{Tan Ka'bah's Latitude} \times \text{Cos Mosque's Latitude} : \text{Sin Longitude Difference} - \text{Sin Mosque's Latitude} : \text{Tan Longitude Difference}}$$

$$\text{Cotan B} = \frac{\text{Tan } 21^{\circ} 25' 14,70'' \times \text{Cos } 00^{\circ} 59' 02,18'' : \text{Sin } 64^{\circ} 47' 56,9'' - \text{Sin } 00^{\circ} 59' 02,18'' : \text{Tan } 64^{\circ} 47' 56,9''}$$

To make it easier to use the calculator, the author made a tutorial on pressing the calculator button. The method is as follows (Hambali 2011):

Press Shift, Press Tan, Press (, Press Tan, Press 21, Press <sup>o</sup>, Press 25, Press ', Press 14.70, Press ", Press x, Press Cos, Press 00, Press <sup>o</sup>, Press 59, Press ', Press 02.18, Press ", Press :, Press Sin, Press 64, Press <sup>o</sup>, Press 47, Press ', Press 56.9, Press ", Press -, Press Sin, Press 00, Press <sup>o</sup>, Press 59, Press ', Press 02.18, Press ", Press :, Press Tan, Press 64, Press <sup>o</sup>, Press 47, Press ', Press 56.9, Press ", Press ), Press X-1, Press =, Press Shift, Press <sup>o</sup> ' ''.

Then the result was 66° 57' 11.94" NW (North – West) and to get the qibla azimuth, then 360° - 66° 57' 11.94" = 293° 02' 48.06". So it was known that the qibla azimuth of Nur Murtaji Mosque was 293° 02' 48.06" NESW (North-East-South-West).

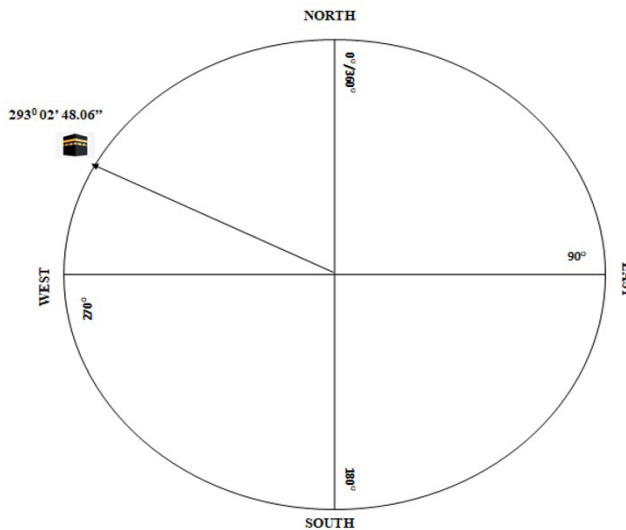


FIGURE 1 Qibla azimuth of Nur Murtaji Mosque

From Figure 1 above, it could be seen that the qibla azimuth of the Nur Murtaji Mosque and the territory of Indonesia is facing the Northwest, not facing the West as is widely understood in the community. After the qibla azimuth of Nur Murtaji Mosque was known, then the qibla direction was measured using the Theodolite instrument. Actually, this tool is designed as a measuring tool for space, such as road length, land area, building height and the like is not designed to determine the Qibla direction, but because the measurement reference uses vertical and horizontal, the theodolite becomes very practical to use to determine the Qibla direction, true north. true north), the sun's height and time, the results of which are very accurate (Angkat et al. 2021). Theodolite must be used outdoors because it requires sunlight to determine the Sun's azimuth.

JAM	RA	Dekl.	EoT	Irtifa'	as-Simtu		Mizwah	
hh:mm:ss	deg	deg	menit	Derajat	deg	min	deg	min
16:00:00	-68,10165696	21,91171658	-05:38	29,67815411	294	49	114	49
16:03:00	-68,0995392	21,91142185	-05:38	28,99721008	294	39	114	39
16:06:00	-68,09742146	21,91112709	-05:38	28,31538591	294	30	114	30
16:09:00	-68,09530372	21,9108323	-05:38	27,63271866	294	20	114	20
16:12:00	-68,09318599	21,91053748	-05:38	26,949244	294	12	114	12
16:15:00	-68,09106827	21,91024264	-05:38	26,26499635	294	3	114	3
16:18:00	-68,08895055	21,90994777	-05:38	25,58000889	293	55	113	55
16:21:00	-68,08683285	21,90965288	-05:38	24,89431368	293	47	113	47
16:24:00	-68,08471515	21,90935795	-05:38	24,20794167	293	40	113	40
16:27:00	-68,08259747	21,909063	-05:39	23,5209228	293	32	113	32
16:30:00	-68,08047979	21,90876803	-05:39	22,83328605	293	26	113	26
16:33:00	-68,07836212	21,90847302	-05:39	22,14505946	293	19	113	19
16:36:00	-68,07624445	21,90817799	-05:39	21,45627023	293	13	113	13
16:39:00	-68,0741268	21,90788293	-05:39	20,76694471	293	6	113	6
16:42:00	-68,07200916	21,90758784	-05:39	20,07710852	293	1	113	1

FIGURE 2 Sun Azimuth Data on July 12, 2021 at 16.00 WIB

To facilitate the determination of the azimuth of the sun, the researchers used software. From Figure 2 above, it can be seen that the Sun's azimuth on July 12, 2021 at 16.00 WIB was 294° 49'. After knowing the Sun's azimuth, the next step was to direct the Theodolite towards the Sun, then the position of the Theodolite was facing 294° 49'. Then, restarted Theodolite and rotated it clockwise towards 293° 02' 48.06" NESW (North-East-South-West), then that was the qibla direction of the Nur Murtaji Mosque.

After measuring the qibla direction using the Theodolite, then the next step was to determine the qibla direction of Nur Murtaji Mosque by marking the qibla direction in the outyard of Nur Murtaji Mosque. The marking of the qibla direction in the outyard of the mosque because it was difficult to mark on the floor of Nur Murtaji Mosque.



FIGURE 3 Measuring the Qibla Direction of Nur Murtaji Mosque Using Theodolite



FIGURE 4 Marking Qibla Direction in the Outyard of Nur Murtaji Mosque

After marking the Qibla direction in the outyard of Nur Murtaji Mosque, a straight line was drawn using a thread so that it could reach the floor of Nur Murtaji Mosque. After that, a sign of the qibla direction was made on the floor of Nur Murtaji Mosque so that it could be compared with the previous qibla direction of Nur Murtaji Mosque.





FIGURE 5 Comparison of Qibla Direction Before & After Calibration

From Figure 5 above, it could be seen that there was no deviation that occurred after a comparison was made between the previous and current qibla direction of Nur Murtaji Mosque. Because the method of determining the qibla direction of the Nur Murtaji Mosque uses the qibla azimuth method with the Theodolite instrument carried out by the Ministry of Religion at Bintan, so it can be concluded that the qibla direction of Nur Murtaji Mosque is accurate.

## CONCLUSION

Based on the discussion above, it can be concluded that the qibla direction of Nur Murtaji Mosque is accurate because at the beginning of the mosque's construction using the Qibla azimuth method with the Theodolite instrument carried out by the Ministry of Religion at Bintan. This happens because the residents of the Nur Murtaji Mosque understand and know the importance of facing the qibla direction precisely. Determining the qibla direction using Theodolite instrument produces a more precise measurement of the qibla direction so as to increase the stability and confidence of Nur Murtaji Mosque's residents in praying. Marking a qibla direction is a benchmark for definite qibla direction for Nur Murtaji Mosque's residents.

From the calculations, it was known that the qibla direction of Nur Murtaji Mosque is  $66^{\circ} 57' 11.94''$  NW (North – West) or  $293^{\circ} 02' 48.06''$  NESW (North-East-South-West). Hopefully, in the future, there will be more mosque residents who are more concerned about the importance of facing the qibla direction precisely,

so that calibration of the qibla direction does not happen again. We also thank the leader, teachers and students of Idris Bintan Islamic Boarding School who have given permission and witnessed the calibration process for the qibla direction of Nur Murtaji Mosque, so this research became successful.

## REFERENCES

- Angkat, M. Arbisora. 2016. Studi analisis penentuan arah kiblat masjid Raya Al-Mashun Medan. *AL-MARSHAD : Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* (OIF UMSU) 2 (1): 34-44.
- Angkat, M. Arbisora, Abd. Rahman, Siti Maheran, Ahmad Jalili, & Haykal Abdurrahman. 2022. Pendampingan pengukuran arah kiblat untuk Santri Pondok Pesantren Idris Bintan. *Surya Abdimas* 6 (2): 218-228.
- Angkat, M. Arbisora, Ahmad Jalili & Siti Maheran. 2021. *Peningkatan Kemampuan Pengukuran Arah Kiblat Untuk Pengurus dan Santri di Pondok Pesantren Idris Bintan*. Jakarta: Direktorat Jenderal Kekayaan Intelektual, 26.
- Angkat, M. Arbisora & Rizki Pradana Hidayatullah. 2021. Pengukuran arah kiblat masjid Syaikh Zainuddin Nahdhatul Wathan Bintan. *JPPM KEPRI : Jurnal Pengabdian dan Pemberdayaan Masyarakat Kepulauan Riau* (STAIN Sultan Abdurrahman Kepulauan Riau) 1 (2): 105-116.
- Arikunto, Suharsini. 2002. *Prosedur Penelitian (Suatu Pendekatan Praktek)*. cet. XII. Jakarta: PT. Rineka Cipta.
- Arkanuddin, Arkanuddin. 2008. *Teknik Penentuan Arah Kiblat*. Jakarta: Lembaga Pengkajian dan Pengembangan Ilmu Falak dan Rukyatul Hilal Indonesia.
- Budiwati, Anisah. 2018. Akurasi arah kiblat masjid di ruang publik. *JSSH (Jurnal Sains Sosial dan Humaniora)* 2 (1): 159-173.
- Butar-Butar, Arwin Juli Rakhmadi. 2018. *Pengantar Ilmu Falak : Teori, Praktik, dan Fikih*. Depok: PT Rajagrafindo Persada.
- Dahlan, Abdul Azis. 1996. *Ensiklopedi Hukum Islam*. I. Jakarta: PT Ichtisar Baru Van Hoeve.
- Departemen Agama RI. 2005. *al-Quran dan Terjemahnya*. Bandung: CV Penerbit Jumanatul Ali Art.

- Dubey, Ashok Kumar. 2014. Global Positioning System. In *Understanding an Orogenic Belt. Structural Evolution of the Himalaya*. Springer Geology. 215-230. Switzerland: Springer.
- Hambali, Slamet. 2011. *Ilmu Falak 1 : Penentuan Awal Waktu Shalat & Arah Kiblat Seluruh Dunia*. Semarang: Program Pascasarjana IAIN Walisongo Semarang.
- Ibrahim, M. Z. & M. Z. Norashikin. 2009. Universal qibla and prayer time finder. *International Journal of Electrical and Computer Engineering* 3 (10): 1816-1821.
- Izzuddin, Ahmad. 2006. *Ilmu Falak Praktis (Metode Hisab-Rukyah Praktis dan Solusi Permasalahannya)*. Semarang: Komala Grafika.
- . 2010. *Menentukan Arah Kiblat Praktis*. Semarang: Walisongo Press.
- Jaya, Dwi Putra. 2017. Dinamika penentuan arah kiblat. *Jurnal Ilmiah Mizan: Wacana Hukum, Ekonomi dan Keagamaan* 4 (1): 63-76.
- Khazin, Muhyiddin. 2004. *Ilmu Falak (Dalam Teori Dan Praktik)*. I. Yogyakarta: Buana Pustaka.
- Munawir, Ahmad Warson. 1997. *al-Munawir Kamus Arab-Indonesia*. Surabaya: Pustaka Progressif.
- Romdhon, M. Ali, and M. Arbisora Angkat. 2021. Bintang panjer sore sebagai petunjuk arah kiblat oleh kelompok nelayan “Mina Kencana” Desa Jambu Kecamatan Mlonggo Kabupaten Jepara. *AL-MARSHAD : Jurnal Astronomi Islam dan Ilmu-Ilmu Berkaitan* 7 (1): 36-49.
- Sameon, Sera Syarmila & Muhammad Saddiq B. Salleh. 2014. Qiblah direction: An android application. *Advanced Science Letters* (American Scientific Publishers) 20 (10-12): 1895-1899.
- Suryabrata, Sumadi. 1997. *Metodologi Penelitian*. Jakarta: PT. Raja Grafindo Persada.