MECCA MEAN TIME PROBLEMATIC AS A WORLD TIME REFERENCE

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Abstract :

Desire of Muslims to replace the present standard of time, namely Greenwich Mean Time, to Mecca Mean Time is the manifestation of a new spirit in the Islamic world in particular. Mecca Mean Time makes *al-Abraj* tower (Mecca Royal Clock) the zero degree point or standard for the commencement of global time. The goal of this study is to find out what are the challenges that occur when Mecca Mean Time is used as a reference for global time. This research is a sort of qualitative research involving library research studies by describing descriptively. After the data is obtained, the author will categorize, analyze and present it in the form of a brief and systematic document. In this study, it was revealed that there was a debate of variations in views amongst different specialists when MMT was utilized as a reference for global time. Bambang Eko Budhiyono is striving very hard to achieve MMT as a world time reference on the basis of interpretation of the Qur'an verse 1 al-Hujurat. Meanwhile, Thomas Djamaluddin has a different perspective since physically and geographically there are no qualities that assist it to make it a time reference or as a main meridian (Prime Meridian) except religious spirit.

Keywords : Time, Greenwich Mean Time, Mecca Mean Time

Abstrak :

Wacana umat muslim mengganti standar patokan waktu yang telah ada yaitu *Greenwich Mean Time*, menjadi *Mecca Mean Time* adalah perwujudan semangat baru dalam dunia Islam khususnya. *Mecca Mean Time* menjadikan Menara al-Abraj atau menara jam raksasa yang juga disebut *Mecca Royal Clock* menjadi titik nol derajat atau patokan dimulainya waktu dunia. Tujuan dari penelitian ini untuk mengetahui apa saja problematika yang muncul ketika Mecca Mean Time ditetapkan seabagai acuan waktu dunia. Penelitian ini merupakan jenis penelitian kualitatif dengan kajian penelitian kepustakaan (*library research*). Dengan dijabarkan secara deskriptif oleh penulis. Setelah data terkumpul, penulis akan mengklasifikasikan, menganalisis dan menyajikan dalam bentuk makalah yang ringkas dan sistematis. Pada penelitian ini ditemukan kontroversi perbedaan pandangan antara beberapa pakar ketika MMT diterapkan sebagai acuan waktu dunia. Bambang Eko Budhiyono sangat berupaya untuk mewujudkan MMT sebagai acuan waktu duia atas dasar interpretasi terhadap al-Qur'an surah al-Hujurat ayat 1. Sedangkan Thomas Djamaluddin berpendapat berbeda dikarenakan secara fisik geografis tidak ada keistimewaan yang mendukung untuk menjadikannya sebagai rujukan waktu atau sebagai meridian utama (*Prime Meridian*) selain semangat keagamaan.

Kata kunci : Waktu, Greenwich Mean Time, Mecca Mean Time

A. Introduction

The inauguration of the Mecca huge clock at the beginning of Ramadan 1431 H, on August 11, 2010, reignited the ambition of certain Islamic academics, especially in Arab nations, to make Mecca the center of time. Several justifications were been presented, among others, that Mecca is regarded the Center of the World, at least when seen from the dispersion of the continents. Actually the project tends to be a "beacon" by making it the largest clock in the world with various additional advantages. However, it does not contain a different understanding of time than is now recognized universally.[1]

The time agreement worldwide, in this case Greenwich Mean Time (GMT), makes the conversation to shift GMT to Mecca Mean Time (MMT) particularly challenging. This is owing to the fact that in the process the initiators of MMT have to make an International Conference and propose a concept that is superior or at least comparable to the GMT idea which has been running for approximately 125 years since 1884.

[1] Thomas Djamaluddin, "Perlukah Mengganti GMT Dengan Mecca Mean Time," Dokumentasi T.Djamaluddin Berbagi Ilmu untuk Pencerahan dan Inspirasi, 2010.

However, it is not impossible to modify an innovation, because of the dynamic and developing nature of science. If the initiators of MMT continue to research and establish that the existing world order can be maintained with the idea they provide, it is not inconceivable that one day GMT, which has survived for more than a century, will be replaced by the notion of standard provisions which constitute the foundation of time. new, especially MMT.

Several research connected to mecca mean time and global time include: Rintoko in her thesis entitled *Penerapan Mecca Mean Time dan Dampaknya terhadap Jadwal Waktu Salat di Indonesia* found that the application of Mecca Mean Time did not change the formulation of the initial reckoning of prayer times that developed in Indonesia, but have a significant effect on the results because they have to adjust to the hijriyah clock model.[2]

M. Aulia Syamsul Riza in her thesis entitled "*Analisis Pemikiran Bambang Eko Budhiyono tentang* Ka'bah *Universal Time*" found that the Kaaba Universal Time system pioneered by Bambang Eko Budhiyono with a theoretical view based on the Qur'an letter Al Hujuraat verse 1. He used the Kaaba in the city of Mecca as a transformation of 0º longitudes, so that Muslims who are between 40º east longitude and 180º (International Date Line), including the State of Indonesia do not precede the time of worship in the city of Mecca (Masjidil Haram). The research also claims that the time of worship is not designated by the position of the International Date Line time system of the Kaaba Universal Time or based on Hijri hours, but based on natural phenomena that occur in a place that reflects the time for worship and applies regionally or locally. local.

Departing from the history and important studies linked to Mecca Mean Time discussed above, by using Mecca Mean Time as a reference for global time, do such complicated challenges arise? So that it can be observed the complications that emerge when the mecca mean time is utilized as a reference for global time.

[2] Rintoko, "Penerapan Mecca Mean Time Dan Dampaknya Terhadap Jadwal Waktu Salat Di Indonesia" (UIN Sunan Kalijaga, 2014).

B. Researsch Method

This research is a qualitative research with a literature study (library research). Thus the data from the research utilized relates to books, journals, as well as print and electronic media connected to records that have significance to this research. The research approach in this article is a qualitative method where once the data is obtained, the author will categorize, analyze and present it in the form of a succinct and structured report.

C. Discussion and Results

C.1. Types of Time

In general, time may be separated into two sorts, namely star time and solar time. Star time is the time linked with the passing of the stars, and is usually utilized by astronomers. While solar time is the time related with the sun's movement which is employed in all sectors of the existence of this globe.[3]

Based on the sundial we may state that the Sun rises at 6 o'clock, culminates at 12 o'clock, sets at 18 o'clock. Actually the orbit of the Sun is not a great basis for calculating time. This is because the path is not totally flat or not consistent, meaning that sometimes it is a little quick and sometimes it is a bit sluggish. Therefore, the duration between the two Suns culmination is sometimes not precisely 24 hours long, one day it might be more than 24 hours and on other days occasionally less than 24 hours.[4]

The daily voyage of the Sun from East to West (retrograd)[5] is really not an intrinsic motion, but due of the Earth's revolution on its axis (rotation) from West to East, one full rotation takes around 24 hours on average.

As a result of this rotation, among others, the occurrence of time disparities and the alternating of day and night on Earth. In addition, the

[3] Djamaluddin, "Perlukah Mengganti GMT Dengan Mecca Mean Time."

[4] Misbah Khusurur and Jaenal Arifin, "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah," *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 1 (2016): 125–26.

[5] Retrograde are these balls each revolving at a distinct speed occasionally seen going backwards and then forward again as visible on Mars (retrograde motion) caused by the location of the Earth's orbit. A Gunawan Admiranto, *Menjelajahi Tata Surya* (Kanisius, n.d.), 4.

direction of rotation from west to east leads regions in the eastern hemisphere to experience day and or night sooner than places in the western hemisphere. As we already know that the Earth revolves on its axis from west to east, therefore as a result all things surrounding the Earth (including the Sun) seem to move around the Earth in the opposite direction (pseudo motion) (pseudo motion). Because the Earth spins on its axis every 24 hours, it is as if the celestial bodies travel around the Earth (360), likewise in 24 hours. If the diameter of the Earth is equal to 40,000 km, then indicates that the speed of the Earth spinning on its axis is 1,667 km/hour (40,000:24). (40,000:24). Compare this with the speed of sound which only reaches 1,191.6 km/hour.[6]

The sun is the center of the solar system. Because it is the center of the solar system, time on Earth is computed based on the circulation of the Sun. In general, it is recognized that solar time is separated into three sorts, namely:

1. True Solar Time

   According to Slamet Hambali, referenced by Misbah Khusurur in his journal, True Solar Time or called by *Waktu Hakiki* (WH) is time based on circulation The true sun/real sun (the real one), i.e. when the Sun reaches its upper culmination, it is set at 12.00.[7] But actually the time used by the Earth when it rotates, is not always the same as 24 hours. Thus, the time from the sun's lower culmination to the time of its upper culmination is also not always 12 hours.

   Based on the results of studies by specialists, the Earth's rotation time spans from 23 hours 59 minutes 41 seconds to 24 hours 0 minutes 28 seconds. So there is a discrepancy that ranges in 47 second intervals. This difference is termed the "time average", which runs from -0o 14' 20" to +0o 16' 23".[8]

[6] Ahmad Junaidi, "Penyatuan Zona Waktu Indonesia Dan Implikasinya Pada Waktu Ibadah," *Justicia Islamica: Jurnal Kajian Hukum Dan Sosial* 9, no. 2 (2012): 152–53.

[7] Khusurur and Arifin, "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah," 129.

[8] Muh.Ma'rufin Sudibyo, *Ensiklopedia Fenomena Alam Dalam Al Qur'an* (Solo: Tinta Media, 2012), 229.

According to Misbah Khusurur, when the Sun reaches its upper culmination (at 12.00) the angle of time is 0°. Thus altering the angle of time affects the change in genuine time. As For example, when the angle of time is +30°, then the real time displays 14.00, and when the angle of time is -45°, then the actual time is at 09.00, so so forth. Furthermore, it may be proven that the determination of True Solar Time (TST).[9]

(TST) = 12.00 + Hour Angle

For example :

a. It is known that the hour angle is 60° (every 15° is worth 1 hour)

   TST = 12 + 60° (60° : 15° = 4 hours)

   TST = 12 + 4

   TST = 16.00

   So that when the Sun's hour angle is 60° time actually it's 16.00.

b. It is known that the hour angle is -75°

   TST = 12 - 75° (-75° : 15° = -5 hours)

   TST = 12 – 5

   TST = 07.00

   So that when the Sun's hour angle is -75° time truly is at 07.00. To figure out the Meridian pass (MP), i.e. time when the Sun is directly at the top culminating point or right at the celestial meridians according to medieval times, which corresponds to the real time when it appears exactly 12 noon, it may be utilizing the formula MP = 12 – e.

2. Mean Time

Mean time or *Al-Waqt al-wasathi* according to Susiknan Azhari is a time system based on the position of the Sun average (fictitious). Determination of this time is generally dependent on longitude which is

[9] Khusurur and Arifin, "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah," 130.

used as a reference for a region. In Arabic it is also known as Az-Zaman al-Wustha or Al-Waqt al-Ausath.[10]

Mean time or what is often termed the middle time, is the time depending on the circulation An hypothetical Sun that looks to have a continuous travel, that implies never too soon and never too late. Thus, the mean time (MT) with the true solar time (TST) might be the same or not. One time the intermediate time precedes the ultimate time while at another moment the middle time is preceded by the ultimate time.[11]

The plane of the Earth's orbit of revolution, which is typically called the orbit on its path around the Sun, is not exactly spherical. However, it is oval in form and causes variances in the distance from the Earth to the Sun in specific months which results in the duration of time in each month being varied. The distance of the Earth's orbit around the Sun is called Aphelion[12] and Perihelion[13].

The Equation of Time (e) which makes the gap between the mean time and the true solar time is deemed positive if at 12 MT, the actual time shows 12.00 greater. For example at 12.00 MT, the real time displays at 12.11 which indicates the equation of time (e) = +11 minutes. Then it is ruled negative if at 12.00 MT, the true solar time has not showed 12.00. For example at 12 MT, the true solar time is 11:47, so the equation of time = -13 minutes.[14]

Based on these two instances, the following formula may be applied: MT=TST - e. This indicates that the mean time may be determined from the true solar time minus the equation of time.

Example :

[10] Azhari Susiknan, "Ensiklopedi Hisab Rukyat," *Yogyakarta: Pustaka Pelajar*, 2008, 28.

[11] Khusurur and Arifin, "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah," 130–31.

[12] The furthest point on the orbit of a celestial body from the center of the item in its orbit. In English it is termed apogee or aphelion. Susiknan, "Ensiklopedi Hisab Rukyat," 37.

[13] The nearest point on the orbit of a celestial body from the center of the item in its orbit. In English it is termed perigee or pherihelion. Susiknan, 163.

[14] Khusurur and Arifin, "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah," 131.

1. Known

   TST = 12h 2m 11s GMT

   e = +02 m 11s (”e” April 26, 2010)

   MT = TST – e

   = 12 h 2m 11 s – (+ 2 m 11s)

   = 12 h 2m 11 s – 2 m 11s

   = 12.00

2. Known

   that TST = 10 h 45m 00 s GMT

   e = -2 m 53sec (”e” April 1, 2010)

   MT = TST – e

   = 10 h 45m 00 s – (-2 m 53s)

   = 10 h 45m 00 s + 2 m 53s

   = 10 h 47m 53 sec

3. Standard Solar Time

   To allow solar time to be used all over the world, humans developed a standard time, so that anyplace in the world may use the same time which is separated into local mean times (LMT). Local mean time is an intermediate time based on a given longitude. People in determining time are directed by the meridians that pass nearly in the centre of a specific region, so that the area in one area is termed the unitary area of time.[15] Local mean time is the official time used in reports, news, announcements, rules of institutions and government organizations. Local mean time is adjusted according to the longitude of the region by reference to the meridian that passes approximately in the center of the area concerned.

C.2. GMT As World Time Standard

In 1884, the International Meridian Conference established the Greenwich meridian as the worldwide prime meridian or zero point of

[15] Muhyiddin Khazin, *Ilmu Falak Dalam Teori Dan Praktik* (Yogyakarta: Buana Pustaka, 2005), 71.

longitude. Where ultimately an observatory in Greenwich, London, England, namely the Royal Greenwich Observatory (RGO) which became the benchmark for the zero degree longitude.[16]

The basis for measuring time is the spinning of the Earth about its axis. Due to rotation Earth, the sun looks to move, rises in the east and sets in the west. The sort of time linked with the movement of the Sun observed at the Greenwich meridian (longitude 0 degrees) is Universal Time (UT) or Greenwich Civil Time. We commonly named it Greenwich Mean Time (GMT) (GMT).[17]

Greenwich Mean Time (GMT) or in Arabic *Al-Waqt Al-Wasathi al-Grinity* according to Susiknan Azhari is the average time based on 0 degrees longitude (longitude of the city of Greenwich). This time applies to the whole world, and is sometimes known as international civil time.[18]

Greenwich Mean Time (GMT) is an international time reference that was initially based on the time of the Sun at Greenwich which was subsequently based on atomic clocks. The established time system has a lengthy history that is supported by international treaties and scientific studies for its development. Until the mid-19th century, each country utilized its own sundial system utilizing its own meridians. The meridian is the north-south line flowing through the zenith that the Sun passes at noon. For the long-distance rail transportation network that was starting to grow at that time, it was important to construct a consistent time system between areas. Without an uniform time system, railway timetables can be chaotic when approaching locations that utilize multiple time systems. This was mainly felt by the rail networks in Canada and the United States.[19]

C.3. Discourse Mecca Mean Time as a Time Standard for Muslims in the World

[16] Rintoko, "Penerapan Mecca Mean Time Dan Dampaknya Terhadap Jadwal Waktu Salat Di Indonesia," 2.

[17] Rinto Anugraha, "Mekanika Benda Langit," *Yogyakarta: Jurusan Fisika Fakultas MIPA Universitas Gajah Mada*, 2012, 20.

[18] Susiknan, "Ensiklopedi Hisab Rukyat," 28.

[19] Djamaluddin, "Perlukah Mengganti GMT Dengan Mecca Mean Time."

Along with the growth of time, science, and technology discourse concerning the prime meridians and the time system continues to evolve. One of them is the Science Conference in Doha, Qatar in 2008 which advises to Muslims throughout the globe to alter the longitude which has been in Greenwich, London, England with the Kaaba which located in the city of Mecca, Saudi Arabia. Zero degrees longitude displacement is signified by erection of a large clock (Mecca Royal Clock) around the Grand Mosque, Makkah.[20]

This conference was opened by Yusuf Qardhawi with the theme "Mecca as the Center of the Earth, Between Practice and Theory", as the presenters at the conference Egyptian geologist Zaglur Najjar, lecturer in Earth science at Wales University, England; and the scientist who pioneered the Makah clock, Yaseen Shaok. The findings of the meeting called to Muslims across the globe to designate Mecca - the Kaaba is located at 21° 25' 25" north latitude and 39° 49' 39" east longitude – as the beginning point for determining time. The rationale is simple, Mecca, according to scientific investigations, is the 'center of the Earth'.[21]

The Mecca Clock Tower is strikingly similar to the Big Ben clock in England. This gigantic clock is about 400 meters from the Grand Mosque and can be seen from four directions with a height of 600 meters and a width of 45 meters, at the top of the dome there is a crescent moon sign. On the watch was a huge Arabic inscription "In the name of Allah." It is proposed that this clock would function with its own standard, namely Saudi Standard Time or three hours ahead of GMT. Big Ben in England is around 94.8 meters high by 6.9 meters broad. Burj Khalifa skyscraper in Dubai with a height of 828 meters is the highest structure in the world currently, Taipei 101 Tower in Taiwan to be erected with a height of 509 meters. The Mecca Clock Tower is intended to contain 21,000 green and white lights that would shine every time it comes to

[20] Rintoko, "Penerapan Mecca Mean Time Dan Dampaknya Terhadap Jadwal Waktu Salat Di Indonesia," 2–3.
[21] ahmad izzuddin, "Menakar Maslahah Mecca Mean Time ?," Kolom Dosen Fakultas Syariah dan Hukum UIN Walisongo Semarang, 2013.

prayer. Reportedly these lights may be seen from a distance of 18 miles or 28.8 kilometers.[22] The clock of the Mecca Tower has began to chime on Thursday 12 August 2010, along with the commencement of the month of Ramadan in 1431 H.

C.4. Pros and Cons of Adopting Mecca Mean Time

An expert named Bambang E. Budhiyono, created a study that aimed to define the notion of MMT quantitatively. Bambang also via his book 'Ka'bah Universal Time: Reinventing the Missing Islamic Time System' says that the notion of the Universal Kaaba Time or Mecca Mean Time adheres to the verses of the Qur'an, notably QS Al Hujurat verse 1

يَآيُّهَا الَّذِيْنَ اٰمَنُوْا لَا تُقَدِّمُوْا بَيْنَ يَدَيِ اللّٰهِ وَرَسُوْلِهٖ وَاتَّقُوا اللّٰهَ ۗاِنَّ اللّٰهَ سَمِيْعٌ عَلِيْمٌ

Meaning : "*O you who have believed, do not put [yourselves] before Allah and His Messenger but fear Allah. Indeed, Allah is Hearing and Knowing.*"[23]

Asbabun nuzul from surah al Hujurat verse 1 that in the hadith transmitted by Bukhari, Ibn Juraij, Ibn Beginning with Abdullah bin Zubai it is claimed that this verse was revealed when The Bani Tamim caravan came to the Prophet Muhammad to solicit his opinion regarding who had the authority to run the caravan. At that time between Abu Bakr and Umar there was a conflict of opinion regarding who had the right to manage the Bani Tamim caravan. Abu Bakr wanted al-Aqra bin Ma'bad to take care of it, but Umar wanted al-Aqra bin Habis to take care of it. The conflict of opinion between Abu Bakr and Umar was eventually settled when the decision was returned to the Prophet Muhammad.[24]

Bambang's interpretation of this verse is that it is a warning for Muslims to be banned from making rules on a matter before Allah and His Messenger. Muslims are also barred from carrying out or implementing certain legal

[22] Urip Santoso, "Alternatif Standar Waktu Dunia Greenwich Mean Time Di Inggris (GMT) Dan MEcca Mean Time Di Saudi Arabia," darussalambengkulu.wordpress, 2013.

[23] R I Departemen Agama, "Al-Quran Dan Terjemahannya," *Semarang: Toha*, 2005, 46.

[24] A Mudjab Mahalli and Asbabun Nuzul, "Studi Pendalaman Alqur'an" (Jakarta: PT RajaGrafindo Persada, 2002), 763.

requirements that are religious in character before the Prophet Muhammad carried it out for himself. According to him, if Muslims follow the concept of Greenwich Mean Time, the location of the city of Mecca 40° east longitude and Indonesia which is located in the eastern hemisphere from Mecca between 95° - 141° east longitude, the Greenwich meridian, has preceded the time in terms of worship than in the Mecca city. It is vital to construct a time system that does not break the laws that have been provided by Allah.[25]

Based on the interpretation above, it was Bambang that prompted to compute and research mathematically as a kind of support for the discourse of shifting GMT to MMT. Solving the difficulty of the time system based on the Koran Al-Maidah verse 97, Bambang Eko Budhiyono discovered the city of Mecca in which there was a Kaaba building as the beginning of establishing the day.

۞ جَعَلَ اللّٰهُ الْكَعْبَةَ الْبَيْتَ الْحَرَامَ قِيٰمًا لِّلنَّاسِ وَالشَّهْرَ الْحَرَامَ وَالْهَدْيَ وَالْقَلَآئِدَ ۗذٰلِكَ لِتَعْلَمُوْٓا اَنَّ اللّٰهَ

يَعْلَمُ مَا فِى السَّمٰوٰتِ وَمَا فِى الْاَرْضِ ۙ وَاَنَّ اللّٰهَ بِكُلِّ شَيْءٍ عَلِيْمٌ

Meaning: *"God has made the Kaaba, the holy house as a center (worship and world affairs) for humans[26] and (as well as) the Haram[27], had-ya[28], qalaid[29]. (Allah made that) so that you know that Allah knows indeed what is in the heavens and what is on the Earth and that Allah is all-knowing of everything.*[30]

Bambang explained that a solution not to precede that time was by executing a longitude translation. 180° (International Date Line) to the longitude of the city of Mecca and designate the longitude that passes through

[25] M Aulia Syamsul Riza, "Analisis Pemikiran Bambang Eko Budhiyono Tentang Ka'bah Universal Time" (IAIN Walisongo, 2012), 46.

[26] The Kaaba and its environs become a secure area for humanity to conduct out their concerns pertaining to the earthly and afterlife, and a hub for the practice of Hajj. With the Kaaba, human existence becomes concrete.

[27] The meanings include: the Haram month (the month of Zulkaidah, Zulhijjah, Muharram and Rajab), the Haram country (Makkah) and Ihram.

[28] These are: animals (camels, oxen, goats, sheep) that are taken to the Kaaba to come closer to Allah, slain in the territory of Haram and their flesh is distributed to the impoverished in the framework of the pilgrimage.

[29] By killing had-ya and qalaid, the individual who sacrifices obtains a huge reward and the impoverished get a piece of the flesh of the murdered animals.

[30] Departemen Agama, "Al-Quran Dan Terjemahannya," 124.

the center of the Kaaba as the zero meridian called the zero meridian of the Kaaba.[31]

The zero meridian line is designated as the starting line for calculating days or the International Date Line , which is the beginning of the day for the whole face of the Earth starting from the zero meridian of the Kaaba. In keeping with the hijri calendar system, the start of the day is also not reckoned from midnight therefore 00:00 is not a change of day but is recommended half a day earlier, specifically at sunset.[32]

The Earth revolves on its axis in one 360° revolution for an average of 24 hours. Every time the Earth rotates 15°, the time taken is 1 hour.[33] This means that the Earth's surface is divided into 24 zones, each zone is 15° broad and the time difference between one zone and the next is 1 hour.

According to Bambang Eko Budhiyono, the 0° longitude which was originally located in the city of Greenwich was transformed to the city of Mecca, which then for the first 15° rotation of the Earth's orbit must be calculated from the Kaaba so that the day continues to roll westward, namely to Africa, to the Atlantic Ocean, continental landmass. America, the Pacific Ocean, the Solomon Islands, to Papua New Guinea, Indonesia, the Indian Ocean to return to the Kaaba, when the cycle reaches the Kaaba for one full day, at that time the start of the turn of the day is set.[34]

The first 15° block of time in the Mecca Mean Time is termed the Kaaba time region with the zero meridian of the Kaaba in the centre. This indicates that the region is bisected by 0° longitude or the longitude of the center of the Kaaba. This place at sunset (ghurub *syamsi*) will witness 00:00 or the turn of the day. The first Kaaba time area is separated into two notably 7,5° west of the

[31] Bambang Eko Budhiyono, "Ka'bah Universal Time" (Pilar Press dan Sentral Kajian dan Informasi Ka'bah. Bogor. 104p, 2002), 28.

[32] Budhiyono, 32.

[33] Dimsiki Hadi, "Sains Untuk Kesempurnaan Ibadah (Penerapan Sains Dalam Peribadatan)," *Yogyakarta: Primapustaka*, 2009, 15.

[34] This indicates that the longitude of the fundamental center of the Kaaba is positioned in the middle of the first 15° area of the partition of the globe into 24 zones with 15° breadth.

Kaaba and 7,5° east of the Kaaba. The extent of this area more or less includes the whole Arabian Peninsula.[35]

For example, the longitude of Jakarta which is located at 106° 58' 18" east longitude and the longitude of Makkah 39° 49' 39" east longitude with the difference in longitude of the two cities is 67° 08' 39" then 360° minus the longitude difference so that the city of Jakarta will be located at 292° 51' 21" longitude of the Kaaba.[36]

Example:

Jakarta Longitude = 106° 58' 18" East

Makkah Longitude = 39° 49' 39" East

Difference Longitude = 67° 08' 39"

Longitude 0° is transformed to Makkah city then 360° -67° 08' 39" = 292° 51' 21" Longitude Kaaba (LK).

The computation of time in the universal time kaaba is based on the circumference of the Earth which is worth 360° which is then divided by 15° so that it becomes 24 hours of time.

Conversion of time to longitude is divided by 15 ° and multiplied by 1 hour which then transforms it according to the Universal Time. The longitude of Jakarta is 292° 51' 21" (LK) then the time conversion is done at 292° 51' 21" /15 x 1 hour = 19h 31m 42s. Prioritize the city of Mecca if in the city of Mecca at that time on Friday at 00.00 Kaaba Time then the city of Jakarta is Thursday at 19h 31m 42d.[37]

Example:

It is known that the longitude of the city of Jakarta= 292° 51' 21" BK

[35] This indicates that the whole Arabian Peninsula is in the same time zone, namely the first time zone (base time zone) (base time zone). See Budhiyono, "Ka'bah Universal Time," 19.

[36] In the Kaaba time system, Universal Time does not distinguish west longitude and east longitude, thus the calculation is directly worth one complete circle, which is 360°.

[37] This computation is based on the declaration not to predate the time of the city of Mecca, see: Budhiyono, "Ka'bah Universal Time," 5.

= 292° 51' 21" /15 x 1 hour

= 19h 31m 42s

the time difference between Jakarta and Makkah is 4h 28m 18s.

According to Thomas Djamaluddin, physically and geographically, there are no specific attributes that warrant making it a time reference or as a prime meridian. Geographically, if Mecca were the prime meridian (longitude 0), then the international date line at 180 degrees longitude would cut Alaska and would be too distant to redirect to the Bering Strait. It had a terrible consequence, because Canada and Alaska, which are the same land region, were compelled to have distinct days. For example, in Alaska it is Monday whereas in Canada it is still Sunday. So it is evident that it is impossible to acquire international consent to make it happen. The question of time cannot be addressed alone, it needs an international treaty. To comprehend it, we must look at the history of international time agreements which relate to the Greenwich mean time.[38]

Trying to shift GMT to MMT needs estimating the estimated time someplace. Estimated time at a place depends on the longitude the site. Of course, by changing the time system from GMT to MMT will modify the value of longitude someplace. To estimate regional time certainty in Indonesia with the MMT time system then time conversion and longitude transformation are needed.[39]

However, as Thomas Djamaluddin noted, to achieve this debate, an international treaty is needed. This implies that the implementation of this MMT must be addressed with provisions and agreements in the international scope, which have been maintained for roughly 125 years.

Receive and apply the Earth's sphere that has been in effect. In addition to changing the face of the Earth's map, this has ramifications for navigation systems for shipping and aviation and for that it is essential to reprogram

[38] Djamaluddin, "Perlukah Mengganti GMT Dengan Mecca Mean Time."
[39] Syamsul Riza, "Analisis Pemikiran Bambang Eko Budhiyono Tentang Ka'bah Universal Time," 14.

electronic equipment. In this situation, if you agree with the Mecca Mean Time must work together to improve and reform the standard navigation method.

D. Conclusion

The topic linked to Greenwich Mean Time and Mecca Mean Time which is used as the world's reference time is essentially a discussion related to time, hence it is required to know about many forms of time. That there are 3 times depending on the Sun's motion, namely True Solar Time (TST), Mean Time, and Standard Solar Time. Trying to change the time zone from GMT to MMT necessitates determining the estimated time somewhere. Estimated time at a place depends on the longitude the site. Of course, by changing the time system from GMT to MMT will modify the value of longitude someplace. To calculate regional time certainty in Indonesia with the MMT time system then time conversion and longitude transformation are needed.

The topic about changing the world time reference to MMT also did not escape the notice of specialists. There are professionals who sincerely work for the realization of MMT as a reference for global time and there are also some who are less supportive owing to the absence of privileges in MMT other than as a religious spirit. However, as noted by Thomas Djamaluddin, to achieve this discourse, an international treaty is needed. This implies that the implementation of this MMT must be addressed with provisions and agreements in the international scope, which have been maintained for roughly 125 years.

E. Bibliography

Admiranto, A Gunawan. *Menjelajahi Tata Surya*. Kanisius, n.d.

Anugraha, Rinto. "Mekanika Benda Langit." *Yogyakarta: Jurusan Fisika Fakultas MIPA Universitas Gajah Mada*, 2012.

Budhiyono, Bambang Eko. "Ka'bah Universal Time." Pilar Press dan Sentral Kajian dan Informasi Ka'bah. Bogor. 104p, 2002.

Departemen Agama, R I. "Al-Quran Dan Terjemahannya." *Semarang: Toha*, 2005.

Djamaluddin, Thomas. "Perlukah Mengganti GMT Dengan Mecca Mean Time."

Dokumentasi T.Djamaluddin Berbagi Ilmu untuk Pencerahan dan Inspirasi, 2010.

Hadi, Dimsiki. "Sains Untuk Kesempurnaan Ibadah (Penerapan Sains Dalam Peribadatan)." *Yogyakarta: Primapustaka*, 2009.

izzuddin, ahmad. "Menakar Maslahah Mecca Mean Time ?" Kolom Dosen Fakultas Syariah dan Hukum UIN Walisongo Semarang, 2013.

Junaidi, Ahmad. "Penyatuan Zona Waktu Indonesia Dan Implikasinya Pada Waktu Ibadah." *Justicia Islamica: Jurnal Kajian Hukum Dan Sosial* 9, no. 2 (2012).

Khazin, Muhyiddin. *Ilmu Falak Dalam Teori Dan Praktik*. Yogyakarta: Buana Pustaka, 2005.

Khusurur, Misbah, and Jaenal Arifin. "Mengenal Equation of Time, Mean Time, Universal Time/Greenwich Mean Time Dan Local Mean Time Untuk Kepentingan Ibadah." *YUDISIA: Jurnal Pemikiran Hukum Dan Hukum Islam* 5, no. 1 (2016).

Mahalli, A Mudjab, and Asbabun Nuzul. "Studi Pendalaman Alqur'an." Jakarta: PT RajaGrafindo Persada, 2002.

Rintoko. "Penerapan Mecca Mean Time Dan Dampaknya Terhadap Jadwal Waktu Salat Di Indonesia." UIN Sunan Kalijaga, 2014.

Santoso, Urip. "Alternatif Standar Waktu Dunia Greenwich Mean Time Di Inggris (GMT) Dan MEcca Mean Time Di Saudi Arabia." darussalambengkulu.wordpress, 2013.

Sudibyo, Muh.Ma'rufin. *Ensiklopedia Fenomena Alam Dalam Al Qur'an*. Solo: Tinta Media, 2012.

Susiknan, Azhari. "Ensiklopedi Hisab Rukyat." *Yogyakarta: Pustaka Pelajar*, 2008.

Syamsul Riza, M Aulia. "Analisis Pemikiran Bambang Eko Budhiyono Tentang Ka'bah Universal Time." IAIN Walisongo, 2012.