

Fortifications in Malaysia: Analysis of the Design Features

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Abstract

Malaysia is rich with the historical background and consequentially resulted in an extensive local architecture that exhibits variations of influences. Fortification is amongst building typologies that have remarkable military history and battlefield evidence. Current inquiries in the field of fortification studies in Malaysia primarily focusing on historical studies. The main objective of this paper is to discuss how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. This paper is focusing on three selected fortifications in Malaysia which are chosen to represent the changes features of the fortification through different eras. The selected three case studies include Kota Johor Lama, Kota Tinggi Johor; Kota Kuala Kedah, Kuala Kedah, Kedah; and Pillbox Pantai Pelindung, Kuantan, Pahang. The analysis will be studied from the aspects of military architectural features; tactical planning and weaponry. Data collection is in the form of site visits and direct observations where it is strengthened with archival records and documents from museums. The analysis and comparison have shown that the selected fortification exhibit different military architectural features that respond to the advancement of weaponry and tactical aspects at that time which shows the variation in the design features. In conclusion, the construction of fortification in Malaysia is diverse in terms of its ability to adapt to the changes in warfare aspects.

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1. Introduction

The Malay Peninsula is strategically positioned at the sea-lane position, allowing trade and foreign influence to enter the states which fundamentally affecting its history. Among the different types of architecture, fortification is one of the building typologies that evolves with a different approach to the design features. Under the Malaysian National Heritage Act 2005, cultural heritage divides into two aspects which include the tangible and intangible form of cultural properties. Tangible heritage comprises buildings, archaeological sites, monuments and artefacts. Spiteri (2015) [1] stated that tangible evidence of historical events such as military architecture could provide a better understanding of the event and lead to an appreciation of the historical landmark. In addition, fortification is classified as a monument that distinctly

demonstrates the military design and technology of a specific period (Spiteri, 2015)[1].

According to Shepard (1982) [2] and Loureiro (2008) [3], the Malay Peninsula was one of the world's major trading states attracting traders from India, China, Arabia, and Europe because of the geographical position at the Straits of Melaka. The activities along the Straits of Melaka become the essence of economic growth and interest in developing these fortifications or settlements. Shepard (1961) [4] reported the history of several numbers of Malay and colonial fortifications around the Malay Peninsula. To elaborate, Raiha (1981) [5] and Abdul Halim (1990) [6] expanded their findings with the features and design of the selected fortifications.

2. Concepts, Terminologies and Weaponry

The construction of fortification in Malaysia has a long history since the Early Malay Kingdom. The construction was dating as early in the 3rd century, where Hindu-Buddhism influenced the Early Malay Kingdom before the arrival of Islam (Saw, 2007; Shepard, 1982) [7,2]. It is recorded in the Malay classic historical texts namely *Sejarah Melayu* or Malay Annal, *Hikayat Merong Mahawangsa*, *Hikayat Raja-Raja Pasai*, *Hikayat Aceh* and *Hikayat Siak* that Kota Gangga Negara in Perak, Kota Gelanggi at Pahang-Johor border and Kota Langkasuka in Kedah are the earliest fortifications built around the Malay Peninsula (Denisova, 2011; Lanang, 1997) [8,9]. The Malay Sultanates and colonise powers are established later at different eras. During the emergence of Malay Sultanate, Malay ruler and colonise powers starting from the conquest of the Portuguese, Dutch and British numbers of fortifications are built around the Malay Peninsula (Abdul Halim, 1990; Raiha, 1981; Shepard, 1961) [6, 5, 4].

The term fortification in the Malay world has different connotations based on specific circumstances. *Istana kota* or fortress mentioned by Lanang (1997) [9] refers to the construction of the palace for the Malay Sultanate where the fortification operates as the Sultan's ruling centre. According to Abdul Halim (1990) [6], the concept of fortress includes a wide array of facilities within an area which may consist of the royal palace, noble house, public buildings and storage for foods and weapons. Mohd Isa (2002) [10] mentioned that politics and traditional administration are not embraced by the sultan alone but also by the Malay rulers and ministers. According to Siti Norlizaiha and Rusamah (2012) [11], the early version of Malay fortification is built in the fulfilment of a royal institution, and during the colonisation period, fortifications are constructed for various circumstances associated with the traditional rule of the Malay rulers and ministers.

Another term for fortification in Malay is *kubu* or *benteng*. *Kubu* or *benteng* conveys the same meaning of fort. Conversely, the fort is merely for defensive purposes where it does not require any facilities compared to a fortress (Oxford Dictionary of Architecture and Landscape Architecture, 2006) [12]. According to Abdul Halim (1990) [6], the fort is equipped with the ability to defend itself against enemy attacks where it has armed guards who are ready to observe and monitor the movements of any enemy units who want to do any spying or intruding. Abdul Halim (1990) [6] added that the design approach of the fort is more straightforward compared to the fortress based on its function. A fort can also be located near the main fortress area where it functions as a supporting fortification to back up the main fortification.

The Malay Sultanate in the Malay Peninsula was constantly attacked by foreign military powers such as the Portuguese, Aceh, Siak, Jambi, Riau, Aru, Bugis and Siam in their bid to dominate the trading route of Selat Melaka (Winstedt, 1940) [13]. According to Abu Abd. Al-Halim (2014) [14], apart from having the force of army troops and strong fortifications, another element to be considered was the use of weaponry and armaments. Wan Mohd Dasuki and Othman (2013) [15] mentioned that the knowledge of warfare using firearms within the Malay Sultanate was undoubtedly robust and the utilisation could possibly be inherited from one Malay Sultanate to another government in the Malay Archipelago.

Centres of civilization were frequently vulnerable to attacks or conquest by other powers. Jones (2012) [16] mentioned that the growing impact of gunpowder weapons had led to the revolution of siege warfare, battlefields tactics and training of soldiers. The first use of cannon was in the Battle of Crecy between England and France was in 1346 (Wills, 2006) [17]. At the sea forefront, sailing ships armed with cannon gave European powers to control of the seas. When the European seafarers established sea routes linking Europe to Asia, there was a rise of warship ushered in a new era of naval warfare (Jones, 2012) [16]. Later during the early 16th century, Loureiro (2008) [18] mentioned that the artillery was established, which leads to the broad range of ammunition, including field artillery and lighter pieces for naval use.

Jones (2012) [16] added that in the era of the World Wars from 1914 to 1945, this period was marked by the development of aviation and motorised warfare especially the tanks. The advancement of weaponry urges different design features of a fortification to be apposite with the tactical aspects which lead to the changes in term of the type of fortification during the Post-World War I era. The construction of fortification named as pillbox is initiate by the British. The pillbox is described as a small low concrete emplacement for machine guns and antitank weapons (Merriam-Webster Online: Dictionary and Thesaurus, 2020) [19].

The pillbox is built as a defensive measure taken by the British as part of their anti-invasion movement preparations for World War II (Hellis, 2011) [20]. The pillbox is usually built at appropriate defensive locations such as along the coastal area, riverside and military airbase where this structure act to hold as long as the troops can to delay the mobility of the attackers (National Army Museum, 2020) [21]. Rouwen Lin (2016) [22] in his interview with Zafrani Arifin from the Malaya Historical Group researcher described that:

When the Japanese descended upon Kota Baru just after midnight on December 8, the British position on the beach was strong, with pillbox concrete bunkers located every 100 meters along the shore that was each manned

by eight to ten men. Between the pillboxes were machine-gun posts. Further out, barbed wire fences two meters in height and multiple land mines lay buried in the sand (Rouwen Lin, 2016) [22].

Changes in artillery and weaponry do influence the transformation of defensive strategy and pillbox is built to adapt to the site's circumstances. The role and purpose of construction of pillbox are mainly for battle preparation. Hellis (2011) [20] added that pillbox is still meeting the function of a fort which meant for defensive purposes, but the design and form are different from the earlier constructed fortifications.

Fortifications as Listed in Malaysia's Heritage List

Referring to the Jabatan Warisan Negara (2015) [23], Kota A Famosa in Banda Hilir, Melaka is the only monument listed under the National Heritage List. The list consists of both Malay and colonial fortifications located around Peninsular Malaysia whereby many other fortifications are not listed. Under the Heritage List in Malaysia the listed fortifications are includes:

1. Kota Kuala Kedah, Kuala Kedah, Kedah;
2. Kota Cornwallis, Pulau Pinang;
3. Kota Long Jaafar, Larut, Perak;
4. Kota Ngah Ibrahim, Matang, Perak;
5. Kota Malawati, Kuala Selangor, Selangor;
6. Kota Raja Mahadi, Klang, Selangor;
7. Kota Tanjung Keramat, Kuala Selangor, Selangor;
8. Kota Supai, Kuala Linggi, Melaka and;
9. Kota Johor Lama, Kota Tinggi, Johor.

The locations of the fortifications as listed in Malaysia's Heritage List are shown in Figure 1. From Figure 1, only Pillbox Pantai Pelindung, Kuantan, Pahang (Post WWI) is not listed under Malaysia's Heritage List. This pillbox is included to discuss how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. It is corroborated with Hellis (2011) [20] where design and form of the pillbox are different from the earlier constructed fortifications thus strengthen the justification of why pillbox is included in this paper.



Figure 1: Location of the fortifications.

3. Methodology

This paper employs a case study research method to discuss how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. Bloor and Wood (2006) [24] acknowledged that multiple methods are often used as data collection for the case study method. Similarly, Yin (2009) [25] proposed six sources of evidence in the case study method including documentation, archival records, interviews, direct observations, participant-observation, and physical artefacts. Besides, field notes are also considered a key source for data (Bloor & Wood, 2006) [24].

The methodology of this study has four main phases. Phase 1 is conducted prior to the site visits; where references are gathered from archival records and documents from museums. In Phase 2, site visits to all fortifications (refer Table 1) is conducted concurrently with data collection where direct observations with field notes are taken as the main source of primary data. The site visits are conducted based on the fortifications listed in Malaysia's Heritage List which include one site visit to a pillbox. Phase 3 is the analysis of the military architectural features; tactical planning and weaponry that leads to Phase 4 which selecting the case studies.

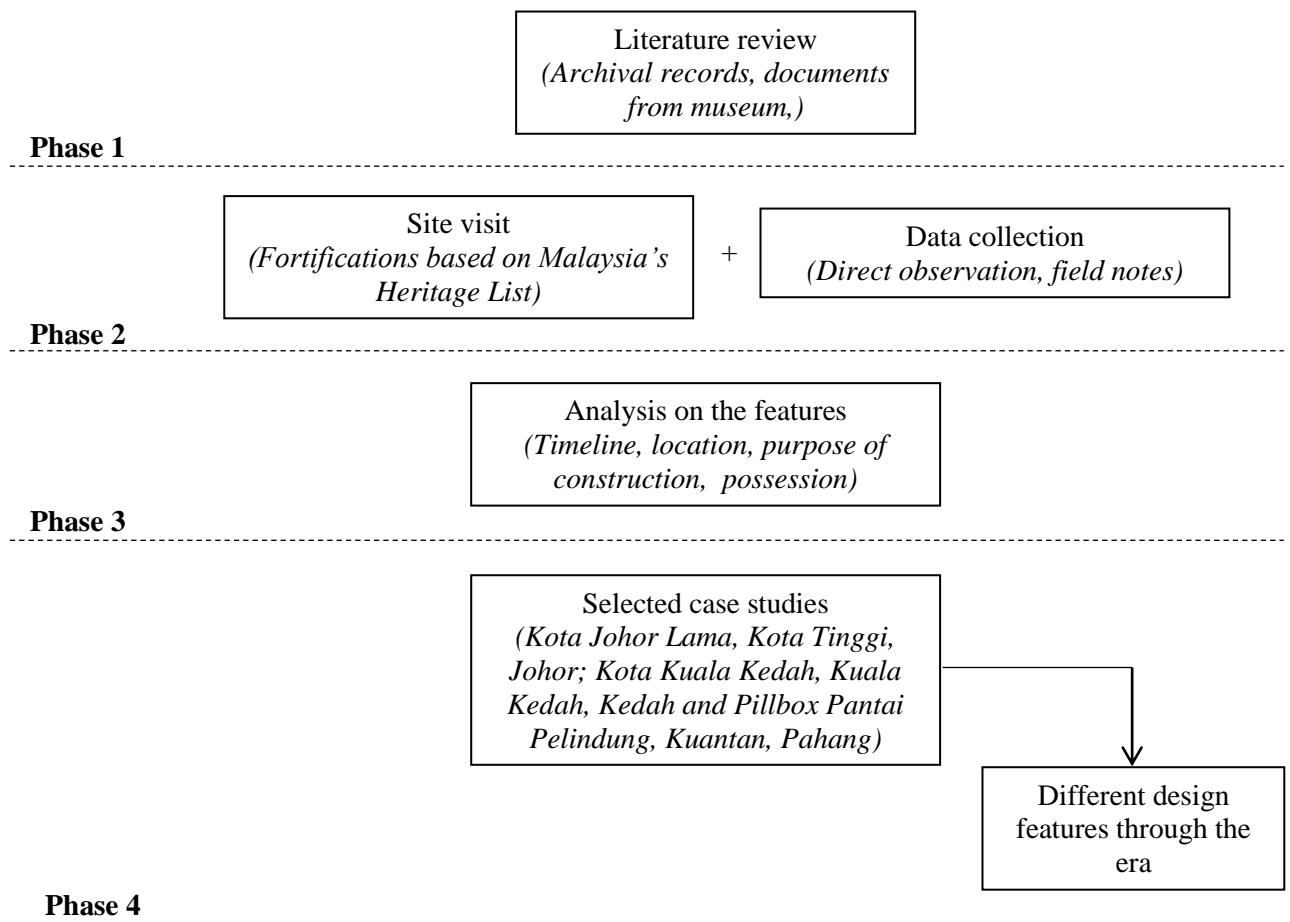


Figure 2: Flowchart of the study's method based on case study research.

Table 1: Inventory of fortifications under Malaysia's Heritage List.

No	Fortification	Year	Timeline	Location	Purpose of construction	Possession	Remarks
1	Kota A Famosa, Banda Hilir, Melaka	1511	16 th century	Elevated land in the coastal area	Defence and ruling centre	Portuguese	National Heritage List
2	Kota Johor Lama, Kota Tinggi, Johor	1540	16 th century	Elevated land at the riverside	Defence and ruling centre	Malay Sultanate	Heritage List
3	Kota Belanda, Pulau Pangkor, Perak	1640	17 th century	Elevated land in the coastal area	Tin storage point	Dutch	Heritage List
4	Kota Supai, Kuala Linggi, Melaka	1757	18 th century	Flatland at the coastal area	Tin storage point	Dutch	Heritage List
5	Kota Kuala Kedah, Kuala Kedah, Kedah	1771	18 th century	Flatland at the riverside	Defence	Malay Sultanate	Heritage List
6	Kota Tanjung Keramat, Kuala Selangor, Selangor	1782	18 th century	Elevated land in the coastal area	Defence	Malay Sultanate	Heritage List
7	Kota Cornwallis, Pulau Pinang	1786	18 th century	Flatland at the coastal area	Administration	British	Heritage List
8	Kota Kuala Muda, Kuala Muda, Kedah	1804	19 th century	Flatland at the riverside	Administration	Malay Sultanate	Heritage List
9	Kota Lukut, Lukut, Negeri Sembilan	1847	19 th century	Hillside at further inland	Tin storage point	Malay ruler	Heritage List
10	Kota Long Jaafar, Larut, Perak	1850	19 th century	Flat area at further inland	Tin storage point	Malay ruler	Heritage List
11	Kota Ngah Ibrahim, Matang, Perak	1855	19 th century	Flat area at further inland	Tin storage point	Malay ruler	Heritage List
12	Kota Malawati, Kuala Selangor, Selangor	1857	19 th century	Elevated land at the riverside	Defence	Dutch	Heritage List
13	Kota Raja Mahadi, Klang, Selangor	1866	19 th century	Elevated land at the riverside	Tin storage point	Malay ruler	Heritage List
14	Pillbox Pantai Pelindung, Kuantan, Pahang	Post-WWI	20 th century	Flatland in the coastal area	Defence	British	None

Referring to Table 1, the location of where the fortifications are constructed varies from the coastal area; to the riverside and built further inland. The possession or ownership of the fortifications is also different. There are fortifications built by:

- Malay Sultanate;
- Malay Ruler;

c. Colonise Powers such as Portuguese; Dutch and British.

In addition, fortification in the Malay Peninsula can be grouped into five periods which are:

- First Period of the 16th century;
- Second Period of the 17th century;
- Third Period of the 18th century;

- d. Fourth Period of the 19th century;
- e. Fifth Period of the 20th century.

It also can be reckoned from Table 1; generally, the main purpose of fortification construction in the Malay Peninsula is for:

- a. Defence;
- b. Defence and ruling centre;
- c. Tin storage point;
- d. Administration.

This paper deliberates the fortification built for defence purposes to achieve the objective, which is to discuss how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. Based on Table 1, there are six fortifications built for defence purposes which includes Kota A Famosa, Banda Hilir, Melaka (1511); Kota Johor Lama, Kota Tinggi, Johor (1540); Kota Kuala Kedah, Kuala Kedah, Kedah (1771); Kota Tanjung Keramat, Kuala Selangor, Selangor (1782); Kota Malawati, Kuala Selangor, Selangor (1857); and Pillbox Pantai Pelindung, Kuantan, Pahang (Post WWI). From the six fortifications, only three of the fortifications are further discuss which includes Kota Johor Lama, Kota Tinggi, Johor (1540); Kota Kuala Kedah, Kuala Kedah, Kedah (1771) and Pillbox Pantai Pelindung, Kuantan, Pahang (Post-WWI). These three fortifications are narrow down because it shows the diversity based on the timeline and location, which influence the changes of fortification in Malaysia in terms of design features. The other three fortifications; Kota A Famosa, Banda Hilir, Melaka (1511); Kota Tanjung Keramat, Kuala Selangor, Selangor (1782) and Kota Malawati, Kuala Selangor, Selangor (1857) are eliminated because of unclear perimeter or no longer accessible to the public thus constraint for further discussion upon its design features.

As mentioned in the sub-topic of Fortifications as Listed in Malaysia's Heritage List, only Pillbox Pantai Pelindung, Kuantan, Pahang (Post-WWI) is not listed under the list. The justification on why Pillbox Pantai Pelindung, Kuantan, Pahang is included in this paper is to demonstrate the design features that correspond to the tactical aspects and the advancement of weaponry which represent on how the design of fortification in Malaysia has changed through the eras.

4. Analysis of The Military Architectural Features, Tactical Planning And Weaponry

Kota Johor Lama, Kota Tinggi, Johor (1540)



Figure 3: Location of Kota Johor Lama, Kota Tinggi, Johor.

Kota Johor Lama located at the district of Kota Tinggi in Johor and one of the fortifications built by the Malays. Referring to Fig. 3, Kota Johor Lama is built in a secluded area and not at the downstream of Sungai Johor. The location of this fortification was secluded from the monsoons, yet the depth of the river allowed medium to small size ships to dock and participate in the economic activities at Kota Johor Lama. Kota Johor Lama is reopened in 1573 during the ruling of the fifth Sultan of Johor, Sultan Ali Jalla Abdul Jalil Riayat Syah II (Nasir, 1977; Shepard, 1961) [26, 4].

Based on-site visit, military architectural features at Kota Johor Lama is straightforward as the mounds are the frontier of this fortification and visually the only fortified structure built elongated at the headland. Winstedt (1992) [27] mentioned that there were no walls or towers at Kota Johor Lama, but the arrangement of the mounds creates and defines the perimeter. The mounds are enclosed at the three-sided fronting Sungai Johor where the rear section is left open for access. There are two different lengths of these mounds. There are also a few small mounds approximately at 6 to 9 feet (2.0 to 3.0 meters) long; facing Sungai Johor. Another two elongated mounds at the sides are roughly measured at 100 feet (30.0 meters) in length. The space within these mounds is an open flat area.



Figure 4: Mounds with cannon embrasures at Kota Johor Lama, Kota Tinggi, Johor.

Kota Johor Lama built at the elevated land; upstream of Sungai Johor at the foreland of Tanjung Batu. The Johor Sultanate encountered constant assaults from Portuguese, Aceh, Riau, and Aru. As described by Shepard (1961) [4], tactically, Kota Johor Lama has a

commanding position that benefits the Johor armies. The location allows an extended distance before the enemies could approach the vicinity of the riverbank, thus enable Johor armies to observe enemy movement from the elevated position.

The foreland of Tanjung Batu naturally covered with huge rocks and stones at its steep terrain. The terrain surface caused difficulty and restrained the movement of enemies climbing up onto Kota Johor Lama (Winstedt, 1992) [27]. Hence, making it challenging for the enemies to attack as the Johor armies would have ample time to prepare a counter-attack from inside Kota Johor Lama. Ab Razak (1998) [28] and Abdullah Zakaria and Zainal Abidin (1994) [29] claimed that there are trenches outside the mounds, but currently, the remaining trenches are not visually identified which suggests corrosion may have disturbed its form.



Figure 5: Tactical aspects of Kota Johor Lama, Kota Tinggi, Johor.

The mounds signify the intention to protect the area. The location where the mounds are built is considered as the weak point of Kota Johor Lama. The mounds are decisively intended as such because enemy attacks come from the direction of Sungai Johor. Therefore, to overcome this weakness, mounds are built and constructed to resist these attacks. According to Abdul Halim (1990) [6], the mounds are layered with blocks of solid stone and gravel fragments which adds to its strength. The layers beneath the mounds are able to be identified by applying a stratigraphy study done by the Museum Department during the excavation works in 1960 (Abdullah Zakaria & Zainal Abidin, 1994; Muzium Kota Johor Lama, 2014) [29, 30]. The height of the mounds is measured at 4 to 5 feet (1.5 to 1.7 meters) which is sufficient to hide the Johor armies from the enemies' sights.

Referring to the location of Kota Johor Lama, the depths and widths of the Sungai Johor are such that it is impossible to be penetrated by the sizeable Portuguese warship. Because of the size of the warship, it is most probably that small Portuguese boats were used to approach Kota Johor Lama, thus explaining why the

military architectural features of Kota Johor Lama are straightforward, with the construction of mounds. The impact of attacks from small boats compared to the warship is different. The warship is usually equipped with naval weapons such as cannon which has a larger impact when the cannonballs are launched from the warship.

Kota Johor Lama is designed to fortify its stronghold against bombardment and also to be able to survive and strike counterattacks by utilising the Malay firearms. The presence of the cutouts at the intervals of mounds that strategically facing Sungai Johor suggests that these are places to position the Malay cannon embrasures. According to Abdullah Zakaria and Zainal Abidin (1994) [29] and Shepard (1961) [4], there are gun-platforms as well, made from wood to hold the position for the cannons. Several scholars also supported the claim that Kota Johor Lama is armed with cannons (Buyong (1980) [31]; Abdul Halim (1990) [6]; Winstedt (1992) [27]; and Mohamed Roselan (1998) [32]). The assembly of the solid stone blocks as the hidden construction method beneath the mounds' structure affirms its ability to withstand artillery attacks from the enemy.

Kota Kuala Kedah, Kuala Kedah, Kedah (1770)



Figure 6: Location of Kota Kuala Kedah, Kuala Kedah, Kedah.

Located at the district of Kuala Kedah, Kota Kuala Kedah is built on a flatland at the downstream of Sungai Kedah. Kota Kuala Kedah was built under the command of Sultan Suleiman Syah II, the 12th Sultan of Kedah in 1602 (Muhammad Hassan, 1968) [33]. Wan Shamsuddin (1990) [34] mentioned, although Sultan Suleiman Syah II resided in Kota Siputeh, he insisted to built another new fortification at the riverside of Sungai Kedah. The intended fortification is built to replace the ports of Kuala Merbok and Kuala Muda during the advent of Islamic influence in the region (Muzium Kota Kuala Kedah, 2014) [35]. Because of the strategic location, Kota Kuala Kedah is envied by other supremacies including Aceh, Siak, Bugis, Siam and the Portuguese.



Figure 7: The fortified wall at Kota Kuala Kedah, Kuala Kedah, Kedah.

The fortified walls are the prominent military architectural feature that is identifiably at Kota Kuala Kedah. The fortified wall is built using brickworks with some local mixed such as chalk from cockle shells, snail shells, as well as egg whites and honey (Muzium Kota Kuala Kedah, 2014) [29]. Kota Kuala Kedah is fortified with two types of the fortified wall; the outer walls and the inner walls. The outer wall has a different height and their stretches vary from 3 to 5 feet (1.0 to 1.5 meters) and 8 to 9 feet (2.4 to 2.7 meters) high and 2 feet (0.6 meters) wide. The inner walls cover some parts of the fortification. Kota Kuala Kedah is built on a flat area and the possible reason why the fortified walls are erected at a certain height is that the area does not have advantages in terms of natural defence. Thus, by building up fortified walls they secure the area and help to strengthen Kota Kuala Kedah from enemy attacks.

F. Augustine (1992) [36] further described that Kota Kuala Kedah is surrounded by moat and there are three gates adjacent to the Alor Melaka tributary that serve as the primary and secondary entrances to the fortification. Unfortunately, the moat is no longer visible possibly due to erosion and environmental changes. Presently, all three gateways are still accessible but closed to the public.



Figure 8: Tactical aspects of Kota Kuala Kedah, Kuala Kedah, Kedah.

Kota Kuala Kedah, on the other hand, has a different physical appearance compared to Kota Johor Lama. Kota Kuala Kedah is built on a flat surface with the fortified wall enclosing the perimeter. The fort does not possess the features of a natural defence except that it is built next to the riverine. Even though the location of Kota Kuala Kedah is at the intersection for trading, the flat surface does not add value to its security.

The location of Kota Kuala Kedah is more vulnerable compared with the position of Kota Johor Lama. Kota Kuala Kedah is situated at the edge of Sungai Kedah which is not sheltered and secluded further inland where it is exposed to assaults from strong forces such as Aceh, Siak, Bugis, Siam and Portuguese. The possibility of the enemy's warship to approach the vicinity of Kota Kuala Kedah is potentially high. Therefore, that is why the fortified walls are constructed with the placement of Malay cannons at the perimeter.

There were cannons install at Kota Kuala Kedah as reported by Shepard (1961) [4], Muhammad Hassan (1968) [27], and Muzium Kota Kuala Kedah (2014) [29]. The cannons are line-up facing towards the direction of Sungai Kedah suggesting that this is where major attacks could be coming from. The presence of cutout holes deliberately constructed by piercing the fortified wall suggests that it is the position for the cannons' lineup. There are two sizes of the cutout holes found in Kota Kuala Kedah. The cutout holes were probably designed to enable the Malay cannons known as *meriam badak berendam* and *meriam katak puru* to be placed.

Pillbox Pantai Pelindung, Kuantan, Pahang (Post WWI)



Figure 9: Location of Pillbox Pantai Pelindung, Kuantan, Pahang.

Pillbox Pantai Pelindung situated at the district of Kuantan in Pahang. This pillbox is probably constructed around the 1930s or early 1940s by the British. It is because at this period the British are prolifically constructing pillboxes of similar kinds in their territories such as in Europe and Asia, in the lead-up to the Second World War (Rouwen Lin, 2016) [16]. Pillbox Pantai

Pelindung is built at flatland in the coastal area of Pantai Pelindung. During the site visit, the location of this pillbox is overlooking the South China Sea. It is half-buried in the earth which possibly to make it easily camouflaged. The location allows the army to oversee enemies movement towards the coastal area.



Figure 10: Tactical aspects of Pillbox Pantai Pelindung, Kuantan, Pahang.

By analysing the appearance of the Pillbox Pantai Pelindung, visually this hexagonal shape structure can

accommodate two or three armies at a time. The height of the pillbox is measured around 5 feet (1.5 meters) height where the army inside is not in a standing position but in position to shoot. There is an entrance at the back of the pillbox while the frontage is facing the Laut China Selatan which has loopholes that serve as openings for shooting.

5. Findings

The main objective of this paper is to discuss how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. The design features of Kota Johor Lama, Kota Tinggi, Johor; Kota Kuala Kedah, Kuala Kedah, Kedah and Pillbox Pantai Pelindung, Kuantan, Pahang are different based on the military architectural features, tactical planning and weaponry. The comparison is shown in Table 2.

Table 2: Comparison of military architectural features, tactical aspects and weaponry.

Fortification	Military architectural features	Tactical aspects	Weaponry
Kota Johor Lama, Kota Tinggi, Johor	<ul style="list-style-type: none"> Structured mound – heaps of soils and layered with blocks of solid stone and gravel fragments 	<ul style="list-style-type: none"> At the riverside, elevated land – a commanding position Naturally covered with huge rocks and stones at its steep terrain – delaying mobility of the enemies Mounds with cannon embrasures 	<ul style="list-style-type: none"> Firearms Cannons
Kota Kuala Kedah, Kuala Kedah, Kedah	<ul style="list-style-type: none"> Fortified walls – brickworks 	<ul style="list-style-type: none"> At the riverside, flatland – overcome the weakness by constructing fortified walls Fortified walls with cannons line-up 	<ul style="list-style-type: none"> Firearms Cannons
Pillbox Pantai Pelindung, Kuantan, Pahang	<ul style="list-style-type: none"> Concrete dug-in 	<ul style="list-style-type: none"> At the coastal area flatland – overcome the weakness by setting up loopholes facing directly to the weak point 	<ul style="list-style-type: none"> Tanks (motorised warfare) Aviation

In this paper, only Kota Johor Lama is built on the elevated land which is located at the steep terrain by the riverside. The riverside works as an obstacle which could delay the mobility of the enemies and give some times for the armies to defence. The elevated land gives a commanding position that benefits the Johor armies. However, fronting the riverside is also the weak point for Kota Johor Lama and to encounter the weakness, mounds are built at the foreland and armed with cannons. In the case of Kota Kuala Kedah, it sets on a flatland which next to the riverside. Built on a flatland does give disadvantages to the fortification; thus, structures such as fortified walls are erected to

safeguard the area. The heights of Kota Kuala Kedah's fortified walls are varied depending on the position of the weak and strong points. The fortification is equipped by the line-up of cannons specifically located at the weak points. Pillbox Pantai Pelindung, on the other hand, is also built at a flatland but located in the coastal area. This pillbox is directly facing the seaside, which considers as the weak point of this fortification. Loopholes are positioned directly facing the direction of where the enemies could launch the attacks.

Based on the case studies of Kota Johor Lama, Kota Tinggi, Johor; Kota Kuala Kedah, Kuala Kedah, Kedah and Pillbox Pantai Pelindung, Kuantan, Pahang the

analysis and comparison study has been done focusing on the military architectural features, tactical planning and weaponry. The findings based on the main objective in this paper can be summarised as below:

1. The military architectural features of fortification have appropriately changed; where from the structured mound layered with blocks of solid stone and gravel fragments has changed to the construction of fortified walls constructed using brickworks. Towards the World Wars era, concrete structures are constructed as a matter of the modification of building materials thus resulted in different design features of the fortification through the different eras.

2. Based on the comparison of tactical planning, the weak and strong point of the site is strategically responds to the surroundings and tactical needs at that time which incorporate with the variation of design features. Weak points are enhanced with additional built-up of military architectural features to apposite the weakness which at the same time manipulating the site's constraints and circumstances which leads to the intent of strengthening the area.

3. The construction of the fortification is conforming the advancement of weaponry that occur at that time. To defend an area from the attacks of firearms and cannons; structured mounds and brickworks are erected as a defendable frontier to oppose the assaults. As the weaponry approach is changed to motorised warfare and aviation; small and low concrete structures of pillbox are constructed as a defensive mechanism that camouflage with the surrounding area.

Based on these three case studies, fortifications are built to meet the strategic military execution. The construction enforces specific criteria to ensure the structures are not vulnerable to any assault. Fortification has its particular usage, primarily concentrating on fortifying certain areas. The diversity of landform, material availability, and different tactical execution determine whether a responsive fortification can function at its optimum level.

6. Conclusion

In conclusion, this paper exhibit on how fortification in Malaysia has changed in terms of design features that correspond to the tactical aspects and the advancement of weaponry. The construction of fortifications signifies and highlights different eras of military history. Fortifications are targeted to any attack; thus it requires this structure to be able to countermeasure any assault. Although these three selected case studies could not conclude or represent the overall evolution of fortification construction in Malaysia, it highlights the placement of military architectural features is coordinated with the tactical needs and changes in weaponry which vary throughout the eras. It also shows the variation of design features of the fortification through the timeline which

correspondingly associate with the purpose of construction and possession.

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