






# Bridges of Post Melaka Sultanate across Centuries

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**Abstract.** The municipal plans and visual representations of the post Melaka Sultanate city reveal the existence of multiple bridges, located in the same vicinity, connecting the trade town of Upeh and the royal complex. Although these bridges displayed variations in appearance and orientation, they all served the common strategic objective of the city. This investigation forms part of a broader research project focused on reconstructing the Melaka Sultanate bridge, which lacked legitimate visual records. The study seeks to identify shared characteristics among Melaka colonial bridges that could inform the design of the Melaka Sultanate bridge. The research primarily relies on visual anthropological analysis to trace the evolution of bridges in the approximate location across different colonial periods. Historical narrative analysis is employed to support the study's argument. The main goal of this research is to gather, categorize, identify patterns, and classify the concept of bridges. Despite the diverse forms and sizes of bridges, the study identifies several common themes from different strategic perspectives. Melaka city bridges tend to be large structures, elevated above the water level, with ample space beneath, generous width, and sometimes even featuring roofs. The research also uncovers intriguing anomalies that raise fundamental questions about the relationship between the colonial Melaka bridges and the main gate of A' Famosa. The data collection for this study relies on colonial Melaka municipal plans and city impressions available during the research period. This study serves as a precedent and indirectly contributes to future reconstruction studies of the Melaka Sultanate bridge, which requires further investigation. Overall, this investigation sheds light on the design and characteristics of bridges in the post Melaka Sultanate era, offering insights that can inform the reconstruction of the Melaka Sultanate bridge based on similarities observed among colonial bridges.

**Keywords:** Melaka Sultanate city, Bridge of Melaka Sultanate, Bridges of Melaka

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## 1 Introduction

A bridge was described in several historical texts [3], [4],[5], [6], [7] and [8] in reference to the fifteenth century kingdom of Melaka Sultanate; connecting the trading town of Upeh and the land of the royal compound. The central Melaka Sultanate City is situated in Bandar Hilir, Melaka of modern-day Malaysia. The Melaka River originates from the inland and acts as a dividing line within the city, creating two distinct sections: a bustling trading hub known as Upeh and the regal compound. The royal complex of the Melaka Sultanate stands in contrast to the trading town, with the river flowing between them and the Sultanate bridge connecting the two.

Currently, Sultanate bridge is no longer exist and neither the Sultanate bridge nor the Sultanate city has legitimate visual record. In the absence of visual record on that specific Sultanate bridge, this study is set to evaluate the entire colonial bridges across centuries at about the same location as precedence in partly contribute to the larger reconstruction study of Sultanate Melaka bridge. It is still not known if the Sultanate bridge partially survived or was used after the 1511 war, especially during the early period of colonisation. This research is embarked with 3 objectives: i) To collect and describe the visual of Melaka bridges during colonial times based on the motivation of the study. ii) To identify patterns and taxonomise the common denomination of bridges of post Melaka Sultanate at principal level, iii) To identify the justification of forms, patterns and characteristics of bridges of post Melaka Sultanate in the light of historical texts.

## 2 Research Perspective

Despite the fact that the bridges during the three colonials of Melaka appeared to be in various shapes and orientations, fundamentally they all provide solutions to answer the same key design problems governed by the interest of the same city. As such, colonial Melaka bridges can be an ideal precedence in reflection to the bridge of Melaka Sultanate.

## 3 Research Methodology

The study is shaped by the character of qualitative and exploratory research; gaining its big picture by gathering, observing examining, analysing and taxonomising a collective of Melaka bridges grounded on a largely historical visual record as underlying basis in building its case. At the time when the study was initiated, researcher was in the midst of reconstruction studies on the Sultanate bridge; examining textual description from eyewitnesses and building the big picture of the bridge covering wide areas of socio-cultural-economy between the two lands which envisioned to have design impact on the bridge. Technically, this research employs two

types of analysis framework involved in the study; i) Narrative analysis by Czarniawska [10], ii) Visual Anthropological framework by Collier [12].

### **3.1 A Narrative Analysis Framework**

It is important to declare that this study obtained its fundamental worldview in regards to socio-cultural- economy of Melaka Sultanate city which can be seen to have the implication of the bridge design at the location based on the texts from China, Malays and Portuguese.

At this point, it is also important to note that the Melaka Sultanate city is the foundation of colonial Melaka. This study employs narrative analysis framework to carefully select, examine and analyse descriptive clues based on a discipline laid out by Czarniawska [10]. This framework has three phases; i) Explication phase which dealt with annotating, simplifying and building perspective, ii) Explanation phase: pursuing objectivist approach in studying historical texts in view of their ‘external criticism’ and in view of authors and rhetorical analysis into the mix “...to unmask interests that underlie the enterprise of knowledge...” [14], Exploration phase: which includes ‘connecting the dots’ based on the big picture and cross referencing with the visual anthropological analysis. The entire phase of Czarniawska’s narrative analysis framework is presented in Table 1.

**Table 1.** Narrative Analysis Framework.

	<b>Explication</b>	<b>Explanation</b>	<b>Exploration</b>
	Standing Under	Standing Over	Standing in for
<b>Concerning</b>	Took the role of a 'naïve' or 'semantic reader'. Notes taken in building worldview surrounding the subject matter; the Sultanate Bridge; despite of discrepancies	Studying the text in regards of their 'external structures' or 'external criticism'. . . looking into the background of each selected text, the writers' biographies and the authorship or rhetorical analysis of their text	Make stand on selected texts implicit and explicitly.
	<b>Reproductive Translation</b>	<b>Inferential Detection</b>	<b>Existential Enactment</b>
<b>Concerning</b>	Includes capturing specific quotes, simplified, putting them into specific perspective and recognising consistent pattern as opposed to the disintegrated, contradicting, or incomplete ones	Try to obtained 'why does the text say what it does?' by the way of 'how does it say it?'	Carefully read the selected texts at least three times and revisited to familiarise with the collected historiographical aspects in the study.
	<b>Reconstruction</b>	<b>Deconstruction</b>	<b>Construction</b>
<b>Concerning</b>	Connecting dots of historical information in harmonic pattern and seeing potentials to provide different angles of perspective in looking at the bridge through the big picture	Revealing the relations of dependence hidden behind relations on the production of text. "...to unmask interests that underlie the enterprise of knowledge..."	Based on the big picture, researcher began the narrative analysis, in 'connecting the dots' with supports of references and precedents especially in gaining various aspects of measures

### 3.2 A Visual Anthropological Analysis Framework

The big picture gained from narrative analysis, was brought up to assist the analysis of municipal plans from the Portuguese, Dutch and British Melaka periods. This part of the study employed visual anthropological analysis framework [12] as laid out by Collier which embodies four stages as demonstrated in Table 2 below:

**Table 2.** A Simplified Framework of Visual Anthropological Analysis

Stage	Activities	Concerning
Stage 1	1. Observe	overtones and subtleties
	2. Discover	connecting and contrasting patterns based on feelings and impressions
	3. Make Notes	(carefully) identifying the images which considered data
	4. Write all questions	Triggered in the mind may provide important direction for further analysis
Stage 2	1. Make Inventory	or a log of all your images
	2. Design Inventory	that reflect and assist your research goals
Stage 3	1. Structure the Analysis	based on specific questions; measure distance, count, compare, information may be plotted on graphs, listed in tables, or entered into a computation
	2. Produce Detailed Descriptions	connecting and contrasting patterns based on feelings and impressions
Stage 4	1. Search Meaningful Significance	by returning to the complete visual record to the data in an open manner. Write details from structured analysis in context
	2. Respond Again	to the data in an open manner. details from structured analysis in context
	3. Re-Establish Context	view images in entirety, then write the conclusions as influenced by this final exposure to the whole

In the first stage, colonial Melaka bridges brought into the study were carefully and openly examined individually and as a group; with annotation and put to question on unique and integrated patterns. Bridges in the location appear in many forms, in slightly different spots and orientations imaginable due to continuous war and rebuilding. The second stage of this study was focusing on building inventory, so the bridges can be viewed in sequence of time, similarities and with annotations. The third stage of the research dealt with structural analysis, in regard to questions and measures which then started making connections to see larger patterns. Stage four in the study dealt with comprehensive analysis in a much more open structure and at principal level.

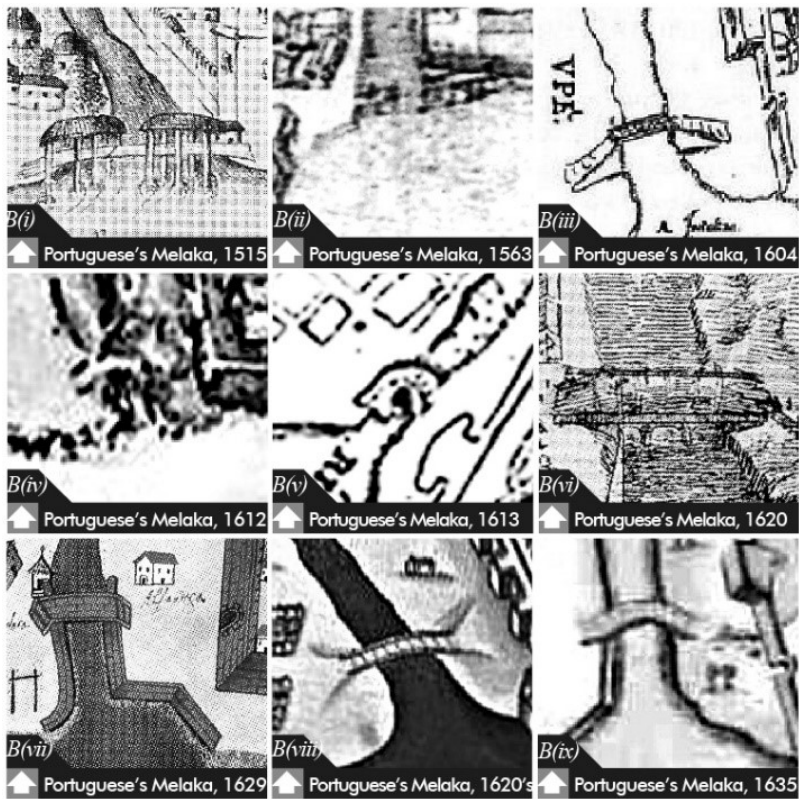
## 4 Visual Anthropological Analysis

Figure 1, 2, 3, & 4 are a compilation of Melaka bridges in representation from the Melaka Sultanate era and subsequent periods until British Melaka after the World War II. Those bridges were cropped from their original artist impression or municipal plan. At the bottom of the visuals are the sequence of periods and years the Melaka Bridge belongs to. These bridges are divided into four periods: Sultanate of Melaka, Portuguese Melaka, Dutch Melaka and British Melaka periods. Technically, these bridges were built in the tradition of Melaka Sultanate Bridge around the same geo-location.



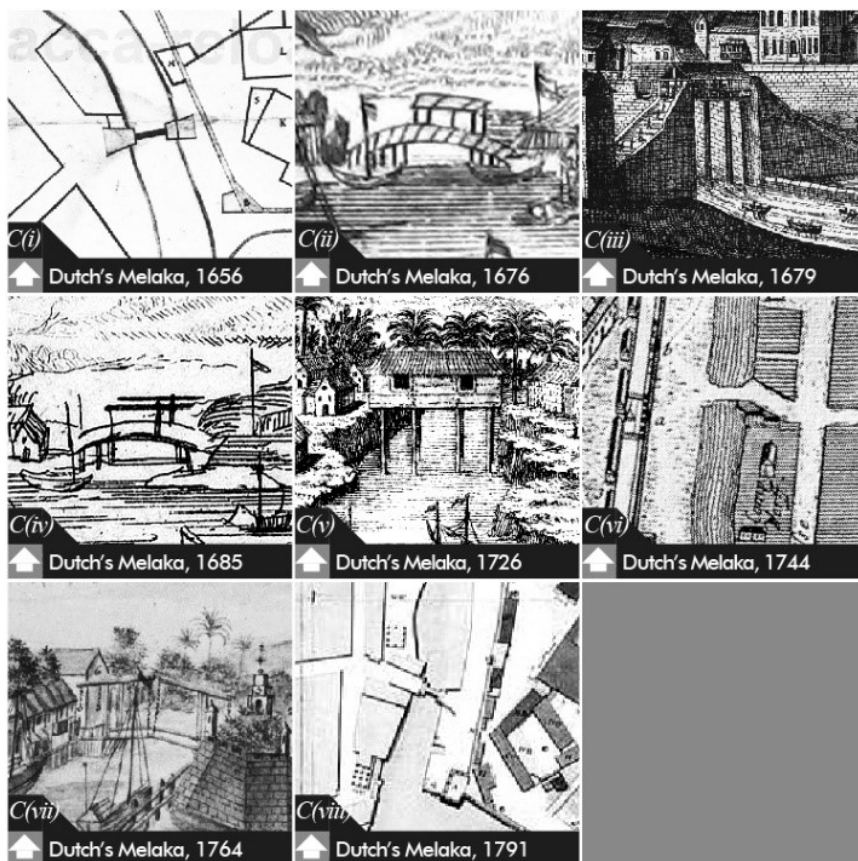
Fig. 1. Impression of Bridges in Melaka Sultanate Period.

However, three impressions of Melaka Sultanate Bridge were not illustrated based on observation. Bridge in Figure 1A(i) was an interpretation of the Sultanate Bridge by Emanuel Godinho de Eredia who was born about fifty years after the Portuguese took over Melaka. His view is important because of his experience when he was born and brought up in Melaka. After careful consideration, this is not a broken bridge based on the relative height of the pillars that are still intact and parallel. Melaka Sultanate Bridge from his perspective has a basic towering form with pinnacles in the middle erected by simple large columns. However, the impractical overall form of the bridge remains a mystery. Bridge in Figure 1A(ii) is a copper engraving done by a credible Dutch publisher, Peter van der Aa. A structure at about the position of the Sultanate bridge (in sequence to the mosque and palace) has shown a three-storey construct towering in the middle. A historical sketch by an anonymous artist shown in Figure 1A(iii) depicted the 1511 war and glimpsed out an interpretation of the Melaka Sultanate Bridge which is quite large with modest escalation towards the middle.



**Fig. 2.** Bridges of Portuguese Melaka Period.

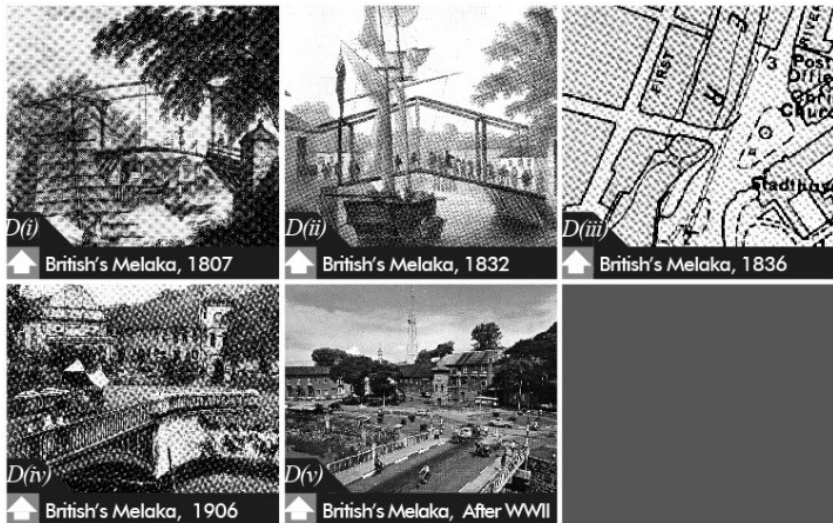
The form of Portuguese Melaka bridges varies along its evolution. The Portuguese Melaka bridge in Figure 2B(i) (1515) which was the closest to the Sultanate era has extended length of pillars to support its structure for roofing. Portuguese Melaka bridge in Figure 2B(i) & B (ii) (1515 and 1563) has about the same basic look with quite elongated bridge's deck. Portuguese Melaka Bridge drawn by Eredia in 1604 had an overwhelmingly tall structure. Interestingly, this tall Portuguese Melaka bridge in Figure 2B(i) (1604) seems to have shared the very similar look with the Dutch Melaka bridge in Figure 3B(iii)(1679). In 1620's, bridge in Figure 2B(vi) seems to be in a similar form with Figure 2B(vii) (1629); both bridges show escalation from both ends which brings their flat deck to a certain height. On the other hand, bridges shown in Figure 2B(iv)(1612), (v) B(1613), B(viii)(1620's); and B (ix)(1635) share about the same curve character, in comparison instead, bringing the center of the bridge to the highest height. In all Portuguese Melaka impressions, bridges were drawn in various degrees of orientation; and are never facing the large main gate which is quite an anomaly in this study.



**Fig. 3.** Bridges of Dutch Melaka Period.

Curve looking bridges can be seen maintained as Melaka entered the Dutch era; reflected in Figure 3C(ii) (1676) and C(iv) (1685). They were unlikely to be the same bridge as there was an interval of the tall bridge as seen in Figure 3C(iii) (1679). Dutch Melaka Bridge in Figure 3C(v) (1726) seems to share about the same tall structure as seen in Figure 3C(iii) (1679); except for the bridge in Figure 3C(v) (1726) which is missing both ends of its tall wedges. The structures believably collapsed because of rampant erosion at both sides of the Melaka riverbank at that time. A drawbridge drawn by Jan Keldermans in (1764), (Figure C(vii)) can be seen in an angular character with its peak at the centre. In all Dutch Melaka municipal plans (see Figure 3C(i) (1656), C(vi) C(1744) and C(viii) (1791)), the primary street is consistently maintaining about 27-degree twist before reaching to the bridge; turning away from aligning with the main gate.





**Fig. 4.** Bridges of British Melaka Period.

The earliest British Melaka Bridge in Figure 4B(i) (1807) (seems to be characterized by the Dutch curved bridge design as seen in Figure 3C(iv)). However, the design of the British Bridge in Figure 4D(ii) (1832) reverts to the look of the Dutch angular drawbridge drawn by Jan Keldermans in Figure 3C(vii) (1764). Although both bridges look almost the same, it can be concluded that they were two different bridges. As such, the two different bridges can also be looked at as the same design solution to serve the same needs of the city. It is indeed very interesting to learn that the primary street no longer took the 'twist' after the demolition of Melaka fortress and the gate in Figure 4D(iii) (1836). As a result, this British Melaka Bridge manifested the alignment on the former site of the large main gate.

## 5 Discussion; Common Denomination of Melaka Bridges in the Light of Narrative Analysis

Regardless of various forms and design solutions of Melaka Bridges in their evolution throughout ages, it can be concluded that there are certain common denominations between them. In this context, researcher relates them to the fundamental aspect of Melaka city. Some key fundamental aspects likely do not change regardless of changes of administration; for instance, in regard to Melaka inhabitants of being a maritime society [2]. Since the real visual of Melaka Sultanate Bridge is not available, these common denominations can shear light in reflecting the fundamental tradition of the bridge at about the same location.

Generically, Melaka Bridges throughout history has the tendency to have an elevated deck to allow not only small boats but also relatively large water vehicles to pass

through it. The floor deck of Melaka bridges has the tendency to be elevated to a certain height by means of tall pillars or curved bridge structure which had formed its peak in the middle. This can be seen in Figure 1A(i), 1A(ii), 2B(iii), 2B (v), 2B(xi), 3C(iii), 3C(v), 3C(vii), 4D(i) and 4D(ii). The most classic example can be seen in Figure 2B(iii), 3C(iii) and 3C(v) which show the bridges' deck elevated overwhelmingly high. This phenomenon seemingly testifies that there were needs relatively large water vehicles passing through underneath the bridge. The same is proposed during the Melaka Sultanate period as study highlighted various potential agricultural commodities by the existence of one thousand one hundred and fifty orchards [4]. The drawbridge during Dutch and British periods reflects the need for tall water vehicles to pass through.

It is common throughout history that Melaka Bridges were a large construct. This can be partly seen in an ancient historical sketch (Figure 1A(ii) and A(iii)) depicting the 1510 and 1511 war when Melaka Sultanate was still in power. This is based on the proportion of humans in the artist's impressions in comparison to the scale of the bridge. The same can be seen in the evolution of the bridge in consecutive periods especially in reference to Figure 2B(i), 2B(iii), 2B(v), 2B(vi), 2B(vii) and 3C(iii). Thus, the structures of the bridges were not only confined to the width of the Melaka River. In some cases, the massive structure of the bridges were extended on both side of the land as can be seen in Figure 2B(iii) & 3C(iii). The extended length of the bridges resulted in maximizing the space for water traffic underneath them. A wide space for water traffic also resulted in the uncomplicated structure underneath all those bridges. The scale of them not only reflects the length but also the width, resulting in ample space for pedestrians. This can be related to the Melaka Sultanate with staggering two hundred thousand inhabitants [9].

Another traceable unique aspect between the Melaka bridges throughout history is the roofing structure for shades. The earliest Portuguese bridge (Figure 2B(i)) that was the closest to the era of Melaka Sultanate had it. So did the bridges in Figure 3C(ii) and 3C(v). This study believes that roofing occurred as the sign of human being put stationed for duty on those bridges. For instance, reported that during his time, sentries and guards were stationed on the bridge [18]. The pattern shows that whenever the bridges were built extremely tall, they tend to have shades. It is not known if the structure on top of bridges in Figure 3C(ii) and 3C(iv) were designed for shades. The importance of shades was also reflected by Alfonso's report that he ordered the bridge to be covered with palm leaves to prevent his troops from getting sick [3].

## 6 Conclusions

There are several important aspects that can be concluded based on visual anthropological analysis on bridges during colonial Melaka periods despite them being in various different forms. Most bridges can be seen built with elevated deck or at least having their peak in the middle. This consistent culture of 'lanchara' (small sized ship)

at Melaka river [1], [4] & [8] was to enable it to pass through underneath it. The simple pillar structure underneath most bridges, provide ample width space to accommodate intense water traffic [1]. Curved and draw bridge reflects solutions for two types of design problems; i) height of the peak, and ii) requires no pillars. This emphasised on the maximum height and volume of water traffic. Melaka bridges commonly built as a large construct which relates to the scale of pedestrian traffic and the use of animals for transportation between the two lands [1], [3] & [8].

The unique aspect of roofing structure for shades, although not too common, should not be taken for granted. The blazing sun of Melaka's tropical climate was a significant factor. It is almost impossible for humans to be stationed on the Bridge without shelter [3]. The roofing factor is in a way a sign of which part of Melaka period that humans were put stationed, either for commercial activities [6] or security [18]. The towering character of the bridge by two out of three ancient artists in reference to the Sultanate period is incomprehensible at the time of this study. The most intriguingly mysterious common denomination of all is in regard to the position and the orientation of the entire Portuguese, Dutch and British Melaka bridge; where almost all of them seem to avoid the main gate of A'Famosa. The British Melaka bridge after the WWII was aligned to the site of the main gate, only at the time when the gate was demolished. This study contributes as a precedent and an indirect idea subjected to further research in view of reconstruction studies on the bridge of Melaka Sultanate.

## 7 Research ethics

This research has obtained the approval from the Research Ethics Committee (REC), Multimedia University [approval number: EA0332021]

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