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# THE IMPLEMENTATION OF FIRE SAFETY MANAGEMENT AT HERITAGE MUSEUMS, GEORGETOWN, PENANG

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## **Abstract :**

Heritage museums are known as being over 50 years old and designed with distinct architectural features of their period. Fire threatens all structures and its impact can be devastating not only for human beings but also especially for heritage museums in economic terms. The loss of property that forms part of an irreplaceable cultural resource where architectural and historical integrity can quickly vanish when there is inappropriate protection from fire. The required and responsive implementation of fire safety management should be considered as part of the long-term preservation strategic plan for any heritage museum. The aim of this research is to investigate the most current fire safety management activity at the George Town, Penang Heritage Museum. The objective is to analyse the current implementation of fire safety management at heritage museums in George Town, Penang. In the chosen heritage museums, the data was collected through observations, literature review and interview methods. The finding found a better fire safety protection by providing the best result of fire safety management. From the survey, the heritage museums show a better understanding in fire safety management.

**Keyword :** *Fire safety management, heritage museums, fire safety protection, historical integrity*

## **1.0 BACKGROUND OF STUDY**

There are several heritage buildings in Malaysia that have been categorized and converted from their original functions into many categories, such as heritage museums, pre-world war shop houses, colonial office buildings, religious buildings, heritage libraries, and heritage hotels. For the heritage museums, they are consisting of Malay architecture, Portuguese architecture, Dutch architecture and British architecture that show different type of culture to the new generation. They are listed as Heritage Buildings or National Heritage Buildings under the National Heritage Act 2005 (Act 645). Heritage museums also consist of private and government ownership, which can be found to be different from the application of fire safety management. However, rather than under the government, the duties of taking care of private heritage museums require special care. This is because private owners have to maintain the fire safety in the heritage museums according to the specifications required. The Fire Rescue Department Malaysia emphasized the aspect of fire protection and extinguishment to prevent the fire from happen. Housing and Local Government Minister Zuraida Kamaruddin state that "Starting from January 2019, the fire certificate (FC) is a requirement for privately owned buildings and all government building are already compulsory of the FC from Fire and Rescue Department"(Star online news 2018). It is important because fire is the greatest fear of the heritage museums, neither of the owner of the museum nor of the material and fabrics of the museum. The fire safety managements are required to reduce building loss of life and injury, and there are several techniques and equipment that can be used to extinguish fire, reduce loss of economic activity, and reduce damage.

## **1.1 Fire and Heritage Museums**

The heritage museums need special approach with the fire protection management criteria norm. This is also making the heritage museums need special approach compared to the new buildings that achieve the standard of fire safety management requirement. The most responsible person is the owner's heritage museums especially for the private own must look forward on how to protect the fabrics of building, visitors and structure of building. Fire safety plays an important role in the heritage museum, particularly in Pulau Pinang, as they are important for architectural value and have become heritage sites. Based on Mydin and Yen (2014), These heritage museums should be protected from fire hazards, but unfortunately there is insufficient legislation and guidance for heritage museums in Malaysia on fire safety. Thus, the fire safety legislation and guideline should also be given so that occupants such as the owner and workers take notice and even enforce them in heritage museums as they are one of the law's requirements.

As an example, the famous Time Tunnel of the Cameron Highland was burnt down after a row of shop lots caught fire due to wiring failure (New Straits Times, 2018). Apart from that, in Prangin Estate, Georgetown, there are seven shop houses is destroyed by fire about 70 percent which is also listed as a heritage building. The Fire & Rescue Department is still investigating the cause of the fire. (New Straits Time 2019). In the other instances of Jalan Penang, George Town, the three pre-war shop houses that come from the souvenir shop then spread to the other buildings are also demolished. They are about 90 percent burned down. (New Straits Time 2017). Thus, on the basis of all the above issues, these show that the heritage museums required extra care, especially private ones, because the owners themselves rely on the protection of the heritage museum. This indicates that by introducing the best fire protection management, the structure of the heritage buildings and the precious materials need to be maintained so that the cultural image does not easily vanish.

### **1.2 Aim**

To investigate the current practice of fire safety management in heritage museums, George Town, Penang.

### **1.3 Research Objectives**

To determine the implementation of current fire safety management in heritage museums, George Town, Penang.

### **1.4 The Scope of Research**

This study is focus on the current fire safety management in heritage museums at George Town, Penang. The owner and occupant of the building are the subjects of this study research. Therefore, to achieve the objective, an interview will be conducted for this research as the respondent will provide the data on building fire safety management. The heritage museums chosen are based on private ownership.

## **2.0 LITERATURE REVIEW**

### **2.1 Management of Fire Safety**

#### *2.1.1 Implement fire safety policy on all relevant installation*

The fire safety policy must be followed on all premises, and in particular for private owners where failing activities are under the control of the building itself. Baker et al. (2013) state that fire safety management is the implementation of policy, standards, instruments, information and procedures, of the task of evaluating, reviewing and controlling fire safety. The owner of the heritage museums shall have a fire safety policy and shall then be inspected by the senior management to ensure the safety of the museums. The owner shall, to the extent reasonably practicable, ensure that the fire threat is treated in compliance with the relevant local code and the legislation in force. Wong and Xie (2014) concluded that the possibility of fire must be handled by the owner in accordance with the applicable local code and project regulations. The avoidance of accidents and ill health of workers, visitors and those who use the museums is the product of fire risk management.

#### *2.1.2 Implement the concept balancing of fire engineering*

Due to the lack of fire safety, heritage museums face fire risks and there is a complex structure that can be destroyed by fire, heat and falling debris. The engineer and architects must therefore apply the idea of combining fire engineering with the objectives of their minds. Salleh (2009) state that the engineer and architect should install fire safety by using sensitivity approach and according to fire balancing concept. The age and design of construction of the structure, its uniqueness, location and accessibility, the size and height of the structure are factors that should be taken into account when deciding on appropriate fire safety requirements for heritage buildings. Kincaid (2012), concludes that unnecessary changes must be prevented by preserving the character or layout of the building in order to achieve a balance necessary to ensure fire protection.

#### *2.1.3 Proper fire safety maintenance*

The active fire system and passive fire system are a must in any types of building in order to provide protection from fire. Every fire protection device, however, has its expiry date or can be broken down occasionally. This kind of thing is unpredictable and this is why the building owner must always be alert. According to Yen and Mydin (2014), In order to protect the building from fire, the fire safety systems must always be tested and maintained for extra caution. In addition, all aspects of fire protection should also be based on the suitability

and functionality of the structure. For example, if there is a risk of fire detection system installation, then the passive system implements the compartmentation and a sprinkler is the active system. Kidd (2010)

#### *2.1.4 Daily check and periodic inspection of fire safety system*

Inspection of fire safety should be carried out and any findings must be corrected as quickly as possible. According to Dong et al (2014), daily manual reviews, weekly departmental checks and periodic inspections of fire safety protection in historical buildings should be carried out. Inside the organization, fire protection should also be encouraged including fire safety documentation and training should always be updated by lessons learned through inspections, fire drills and accidents. This includes routine fire precaution tests, investigating whether there is an incident and recording other details. In order to ensure that all fire safety protections are in place and always maintained, there must be routine inspection and preparation.

#### *2.1.5 Installation fire safety with minimum impact on fabrics*

In order to protect heritage museums, when installing fire safety, it is a major challenge with minimal effect on fabric since they must be maintained in addition to the safety of occupants who need protection. The true fabric lost to fire is irreplaceable because no matter how good the subsequent reconstruction may be, the original was lost forever. The loss of genuine fabric in a fire is irretrievable in the case of a heritage museums (Salleh, 2011). It follows that the preservation and safety of heritage museums must include by ensuring the best possible fire protection for them. Based on Roslan and Said (2017), in order to have fire prevention, the architect and engineer would need to have the sensitivity and ingenuity approaches to avoid any harm to the fabrics. This is not to disregard occupant safety which remains of paramount importance but rather to ensure that fire mitigation initiatives broaden to include the protection of the fabric and building content beyond the immediate life safety requirements. In order to prevent fires from occurring in the first place, good management will do a lot.

#### *2.1.6 Conduct fire drill to the staff*

Fire drills should provide realistic instruction for the personnel and assess the efficacy of the training. According to Dong et Al. (2014), as for the awareness of fire, there should be training to the staff. This will also expand the field of emergency communication protocols that can be accessed via the communication of the fire protection system and equipment. Fire prevention initiatives and other emergency services are also important for the purpose of fire drills, which should be conducted at least once a year. Apart from that, Wong et al (2014) mention that, the staff training continuous from the first day start work and still continue to refresh about the training.

#### *2.1.7 Update the fire safety system and fire safety management plan*

Yen and Mydin, (2014) mention that the measures taken in planning fire risk reduction are the 'best practice' in the heritage building management strategy. Fire safety management should be provided for each building so that they can work closer to implementing the fire safety management plan. According to Salleh (2009), the fire safety management plan is essential as the heritage building always exposed to the fire. Besides, the fire protection system and fire safety management plan must be revised with the authority so that they recognize any improvements to the fire safety inside the house. Wong et al (2014) state that every worker has their own responsibilities in maintaining and updating the fire safety management plan. So, they should know their own task what to do in order to protect the building during the event of fire.

#### *2.1.8 Prepared disable evacuation (disable friendly)*

The most important thing in any building, particularly the heritage museums is disabled evacuation. This is because the heritage museums consist of individuals from local or foreign countries who come to visit. Mostly, the services for the disabled person were not offered by all heritage museums. The management of disability evacuation in fire evacuation should be carefully prepared as the heritage museums are open to the public. Wong et al (2014) mention that there should provide some features by the building fire safety strategy to help evacuate the disable person. As an example, provide disable refuges where it is the safe place to wait for a short period like protected stairs and should have clear sign "Disable refuge – keep clear".

### **3.0 METHODOLOGY**

The methodology of study is therefore an essential part of any research. This research followed a qualitative method of systematic analysis of literature by conducting interviews with the owner and occupants and

observation techniques to obtain the results. The private heritage museums selected are the Pinang Peranakan Mansion, Sun Yat Sen Museum and House of Yeor Chop Ee.

#### **4.0 FINDING**

This study found that the current fire safety management have achieved the best level of satisfaction of fire safety management in the heritage museums, Georgetown, Penang. This can be referred that majority of the respondent have better understanding in fire safety management at the three chosen heritage museums and they are reliable to be as a guideline to the owners to apply the fire safety management in order to avoid event of fire.

#### **4.1 The current fire safety management implementation in heritage museums, George Town.**

From the systematic literature review from Table 1 below, this study found the current practice of fire safety management applied to all of the selected heritage museums. In addition, the fire safety management have outstanding performance for the case study at the three heritage museums selected. Therefore, all the heritage museums apply mostly all the mentioned fire safety management practice according to the suitability of the building. From the table below, almost all fire safety management in the Heritage Museum is applied by the Sun Yat Sen Museum, the House of Yeap Chor Ee and the House of Pinang Peranakan. In selected heritage museums, the current fire safety management can therefore be evaluated and explained from the latest fire safety management on Table 2. To conclude, the three chosen heritage museums have a satisfactory management of fire safety based on the current management of fire safety introduced in the heritage museum. They have met the criteria required in the heritage museums and with their fire safety management can guaranteed the safety of the occupant.

This research related to the fire safety for heritage museums private own that have been reviewed in this study and Table 1 below show the finding of this research.

**Table 1:** List of research related to fire safety management in heritage museums

<b>Author</b>	<b>Fire safety management</b>	<b>Pinang Peranakan Mansion</b>	<b>Sun Yat Sen Museum</b>	<b>House of Yeap Chor Ee</b>
Baker et. al (2013), Wang & Xie (2014)	Implement fire safety policy on all relevant installation	/	/	/
Salleh (2009), Kincaid (2012)	Implement the concept balancing of fire engineering	-	/	/
Mydin (2014), Kidd (2010)	Proper fire safety maintenance	/	/	/
Dong et. al (2014)	Daily check and periodic inspection of fire safety system	/	/	-
Roslan (2017), Salleh (2011)	Installation of fire safety with minimum impact on fabrics	/	/	/
Dong & Wong et. al (2014)	Conduct fire drill to the staff	/	/	-
Mydin (2014), Salleh (2009)	Update the fire safety system and fire safety management plan	/	/	/
Wong et. al (2014)	Prepared disable evacuation (disable friendly)?	-	-	-

**Table 2** : The fire safety management

No.	Fire safety management	Explanation
1.	Implement fire safety policy on all relevant installation	<ul style="list-style-type: none"> <li>By undertaking an evaluation of the premises, the owner and the staff manage the heritage museums in order to recognise any risk to the safety of the persons concerned in relation to the damage caused by the fire and to take all necessary fire safety measures to ensure the safety of the persons concerned within the heritage museums. This was done by calling BOMBA to ensure according to the statute, the fire policy was enforced.</li> </ul>
2.	Implement the concept balancing of fire engineering	<ul style="list-style-type: none"> <li>Have their own architect and engineer in improving the fire safety that come out with the concept balancing of fire engineering</li> </ul>
3.	Proper fire safety maintenance	<ul style="list-style-type: none"> <li>By ensuring that arrangements are made for the heritage museums to maintain fire safety provisions. For example, in accordance with the relevant quality requirements, fire alarm and alert systems are controlled.</li> </ul>
4.	Daily check and periodic inspection of fire safety	<ul style="list-style-type: none"> <li>Daily check and periodic inspection of fire safety system weekly by the appointed staff in charge to check such as fire extinguisher for every week to ensure the date expired not over the limit and always can be used</li> </ul>
5.	Installation of fire safety with minimum impact on fabrics	<ul style="list-style-type: none"> <li>Construction conservators have usually accepted that the greatest minimal physical impact on the fabric and decor of the building should be the application of the fire safety scheme.</li> </ul>
6.	Conduct fire drill to the staff	<ul style="list-style-type: none"> <li>Once a year or in a few months, they will conduct fire drill to the staff so they know how to handle the event of fire They called BOMBA to conduct fire drill and every staff compulsory to join the fire drill training</li> </ul>
7.	Update the fire safety system and fire safety management plan	<ul style="list-style-type: none"> <li>The owner often takes care of the fire safety plan by providing the staff, including BOMBA, with specific instructions and accurate details. For example, if there is some renovation inside or outside the heritage museums or changes in layout and the fire protection system is still updated, it is easy for them to recognize every inch of the museums.</li> </ul>



## **5.0 RECOMMENDATION**

There are some recommendations and suggestions to improve the fire safety management and can be used as guideline to the owners and management team of fire safety in the heritage museums to avoid event of fire occur. The recommendations are as below:

- a) The awareness of the owners is the most crucial especially at private own building where the responsibilities of fire safety management on the hand of the owners. So, there must be seminar or conferences on fire safety management so they know their obligation in maintaining the structure of the building.
- b) Set up a management team of fire safety in handling specific task especially regarding the fire safety management. They should know their task and responsibility in maintaining the fire safety management in the building.
- c) There should be also inspection of building thoroughly besides inspection of fire safety system to avoid any possibilities of short circuit of wire even though it might be consumption of cost.

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