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FIRE SAFETY SYSTEM AT CINEMA IN KLANG VALLEY

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ABSTRACT

Fire is essential in everyday life. Fire could be defined as a chemical reaction of the combination of heat and oxygen, which resulting tangible costs to property and human losses. The entertainment industry most recent year with 33 fire incident instances throughout all states in Malaysia occurred in 2016. Fire outbreak at the cinema is very rare cases. However, when fires happen, they could endanger people's lives, the building's structure, and its property. In ensuring the safety of moviegoers, there is a need to ensure that the cinema is designed based on the prescribed requirements in UBBL 1984. Therefore, this paper intends to identify the fire safety requirement prescribed for cinemas. This paper employed a qualitative methodology. Archival documents are used to identify the fire safety requirement for cinema. The documents used are UBBL 1984 and Malaysian Standard. A thematic analysis was used to analyse the data. All prescriptive requirements are grouped based on the types of fire safety. Based on Fifth Schedule UBBL 1984, this paper found that cinema falls under VII purpose of groups known as the place of assembly. Nine by-law prescriptive requirements are identified based on the extensive review of the UBBL 1984. This prescriptive requirement is essential for a better understanding of fire safety in cinema. The research recommends further study to identify the fire safety compliance at the cinema building.

Keywords: *fire safety, cinema, requirements, active, passive*

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INTRODUCTION

Fire is essential in everyday life. Fire could be defined as a chemical reaction of the combination of heat and oxygen, which resulting tangible costs to property and human losses. The elements in the fire triangle are heat, fuel and oxygen (Jaafar, 2018). The combination of these three elements with proper ratios leads to fire. A fire can tremendously affect the number of lives lost and lead to enormous losses for the building management.

Cinema is known as a place for people to watch movies. Generally, there are 150 - 250 seats available in one hall cinema. Due to the high number of seats available, it will lead to overcrowding in case of fire. Based on Department of Statistics Malaysia (2021), the entertainment industry most recent year with 33 fire incident instances throughout all states in Malaysia occurred in 2016. The fire in a cinema at Golden Screen Cinemas (GSC) Mid Valley caused damage to the cinema hall's back corridor (The Star, 2011). Another fire accident at MBO Cinema Kulajaya caused panic among 120 moviegoers. However, there were no reported injuries or fatalities. The fire was believed to have occurred at the corridor leading to the cinema, which is located inside the UMall (Kim, 2015). 80% of the fire destruction affected the first and second floors of the cinema at Bukit Mertajam, Penang (Rozi, 2022).

Fire outbreak at the cinema is very rare cases. However, when fires happen, they could endanger people's lives, the building's structure, and its property. Besides, occupants will have a limited time to either put out the fire or evacuate the building in case of fire. It is necessary to pay attention to the suitable design operation system to give more time to the people to escape in the event of fire (Ramezani et al., 2022). This case must be taken seriously, especially in the cinema because when a film is going on the room will be dark because there is no light. In ensuring the safety of moviegoers, there is a need to ensure that the cinema is designed based on the prescribed requirements in UBBL 1984. Therefore, this paper intends to identify the fire safety requirement prescribed for cinemas.

FIRE SAFETY AT CINEMA

Fire is helpful in daily life. However, it could also cause changes and injuries. Generally, fire is caused by a chemical interaction between an atmospheric source of oxygen and fuel. The fuel must be heated to its ignition temperature for the combustion reaction to occur (Harris, 2021). The reaction will continue with enough heat, fuel, and oxygen. Table 1.1 presents the definition of fire.



Figure 1: Fire triangle

Source: Northwest Fire Science Consortium, (2018)

Table 1: Definition of Fire

Author	Description
Mauk (2022)	Fire is a chemical reaction that releases light and heat. The display usually marks the meeting of combustible material and oxygen, although other chemicals can also spark flames.
Engel (2020)	The three components must be mixed in the proper ratios for a fire to start. The fire is turned out if one or more of the three components is eliminated.
Semenov & Federov (2019)	Fire factors necessary for its occurrence and existence are indicated, and attention is paid to the fire safety problem.
Kelly et al., (2020)	Fire is a natural force that shapes many biological groups and has significantly influenced biodiversity's evolution.
National Wildfire Coordinating Group et al. (2018)	Fire is when a material, like a fuel, undergoes rapid oxidation during the exothermic chemical process of burning, heat, light, and several reaction products are released.
Iqbal et al. (2019)	Fire is also defined a natural disaster incident that harms nature and a group of individuals.

The primary goal of fire prevention systems is to prevent the spread of smoke and fire and ensure the users' safe egress. In addition, fire protection is required to prevent and minimise damage to the building's structure, and neighbouring structures, and the possibility of emergency services failing. Table 2 shows that fire safety can be divided into two measures; active fire protection and passive fire protection.

Table 2: Types of Fire Protection

Active fire protection	Passive Fire Protection
Fire hydrant	Means of escape
Fire extinguisher and fire hose reel system	Compartmentation
Riser	
Sprinkler system	
Fire detection and alarm system	

According to Falcon (2023), an active fire protection system takes a trigger action when there is a fire. Either a manual or automatic reaction action is possible. Active fire defence engages the fire in a direct fight, whether attempting to control, suppress, or put it out. Incorporating an alarm system into fire protection is vital because the responding fire department's activities would count as active fire suppression once they arrive. Active fire safety procedures are used within the structure to put out fires after they have started. They are crucial for dealing with fire emergencies and are also known as firefighting equipment (Odaudu et. al, 2019).

On the other hand, passive fire safety measures are included in a building's design to stop the spread of fire and provide firefighters adequate access to fire once it has started. Compartmentalisation, the use of suitable corridor widths and lengths, the use of non-combustible building materials, and the provision of simple accessibility for firefighting professionals are some examples of passive safety measures (Aderonmu & Eghobamien, 2021).

Cinema is a place for people to watch and view movies in a hall. With an excess of new cinemas cropping up almost every corner of the country every year, viewers are no doubt spoilt for choice when it comes to choosing the perfect cinemas to indulge in cinematic pleasure. To keep things interesting and appealing to customers as numerous cinemas open countrywide, exhibitors also create varied hall and seat varieties, raising the calibre of cinematic products. Many types of cinema halls offer different movie-watching experiences. They are 2D halls, Dolby-Atmos Halls, IMAX, ScreenX, 4DX, Kid-friendly Hall, and sensory-friendly halls.

METHODOLOGY

The UBBL 1984 is the legal building regulation that governs fire safety requirements in buildings in Malaysia. This paper employed a qualitative methodology. Archival documents are used to identify the fire safety requirement for cinema. The documents used are UBBL 1984 and Malaysian Standard. Both documents are essential in extracting the fire safety requirements. According to Hamed et al., (2013), a qualitative analysis examines the relationship between data categories and themes

to understand the issue better. A thematic analysis was used to analyse the data. All prescriptive requirements are grouped based on the types of fire safety. All data is presented in a table for easy access and reference.

Fire Safety Requirement for Cinema

The design criteria for fire safety at the cinema are related to types of fire safety: active fire protection system and passive fire protection. The design criteria for fire safety at cinemas in Malaysia must follow The Uniform Building by Laws 1984 (UBBL 1984). UBBL 1984 is a prescriptive building code which is a requirement by law that needs compliance. It sets rules and regulations on the application of the code and provides pre-determined prescriptions.

Based on Fifth Schedule UBBL 1984, cinema falls under VII purpose of groups known as the place of assembly. By-Law 179 classified the place of assembly based on its capacity. Class A capacity is 1000 persons and more, Class B capacity is 300-1000 persons, and Class C is 100 – 300 persons. Cinema in Malaysia falls under Class B and Class which can accommodate 30 persons to 335 persons in a cinema hall. Table 3 presents the fire safety requirements for cinema prescribed in UBBL 1984.

Table 3: Fire safety requirements for cinema prescribed in UBBL 1984

Types of Fire Safety	Design Criteria	UBBL Code	Design Requirement
Active Fire Protection System	Portable Fire Extinguisher	227	<ul style="list-style-type: none"> Portable extinguishers shall be provided in accordance with the relevant codes of practice and shall be sited in prominent positions on exit routes to be visible from all directions, and similar extinguishers in a building shall be of the same method of operation.
	Lighting Aisle	111	<ul style="list-style-type: none"> All staircases shall be properly lighted and ventilated according to the local authority's requirements.
	Emergency exit signs	172	<ul style="list-style-type: none"> Readily visible signs shall mark storey exits and access to such exits and shall not be obscured by any decorations, furnishings, or other equipment. A sign reading "KELUAR" with an arrow indicating the direction shall be placed in every location where the direction of travel to reach the

			<p>nearest exit is not immediately apparent.</p> <ul style="list-style-type: none"> • Every exit sign shall have the word "KELUAR" in plainly legible letters not less than 150 millimetres high with the principal strokes of the letters not less than 18 millimetres wide. The lettering shall be in red against a black background. • All exit signs shall be illuminated continuously during periods of occupancy. • Illuminated signs shall be provided with two electric lamps of not less than fifteen watts each.
	Extinguishing System	Tenth Schedule	<ul style="list-style-type: none"> • For Class A and B: Automatic Sprinklers Hose Reel
	Fire Alarm System	Tenth Schedule	<ul style="list-style-type: none"> • For Class A and B: Manual Electrical Fire Alarm System
Passive Fire Protection System	Seating	184	<ul style="list-style-type: none"> • The spacing of rows of seats from back-to-back shall be not less than 825 millimetres, nor less than 675 millimetres plus the sum of the thickness of the back and inclination of the back. • There shall be a space of not less than 300 millimetres between the back of one seat and the front of the seat immediately behind it as measured between plumb lines. • Rows of seats between gangways shall have not more than fourteen seats. • Rows of seats opening on to a gangway at one end only shall have not more than seven seats. • Seats without dividing arms shall have their capacity determined by allowing 450 millimetres per person.
	Exit Door	186	<ul style="list-style-type: none"> • All doors used by the public as exit doors from any part of the place of assembly or leading to

the open air, shall open only in the direction of exit.

- In place of assembly all exit doors and doors through which the public pass on the way to the open air shall be without lock, bolts, or other fastenings while the public are in the building:
- Provided that doors used for exiting only may be fitted with panic bolts.
- Panic bolts fitted to doors in a place of assembly shall be not less than 750 millimetres or more than 1100 millimetres above the floor.
- Turnstiles, if installed in a place of assembly, shall be arranged clear of the line of exit, and shall not be included in the calculation of exit width.
- In a place of assembly, every external door used by the public and every collapsible gate shall be capable of being locked in the fully open position in such a way that a key is required to release such door or gate from such open position.

Exit Details 183

- Every place of assembly, every tier or balcony and every individual room used as a place of assembly shall have exits sufficient to provide for the total capacity thereof as determined in accordance with by-law 180 and as follows:
 - every Class A place of assembly (capacity one thousand persons or more) shall have at least four separate exits as remote from each other as practicable.
 - every Class B place of assembly (capacity) three hundred to one thousand persons) shall have at least two separate exits as remote from each other as practicable,
-

		and if of a capacity of over six hundred at least three such exits.
		<ul style="list-style-type: none"> every Class C place of assembly (capacity one hundred to three hundred persons) shall have at least two means of exit, consisting of separate exits or doors leading to a corridor or other space giving access to separate exits in different direction.
Travel Distance	Seventh Schedule	<ul style="list-style-type: none"> For Place of Assembly: Un-sprinklered: 45m maximum travel distance Sprinkled: 61m maximum travel distance

CONCLUSION

Fire safety codes for cinema in Malaysia were reviewed. All these by-law prescriptive requirements are useful in understanding the present situation of fire regulations for fire safety in cinema. There were nine by-law prescriptive requirements based on the extensive review of the UBBL 1984. The by-laws are; (i) By-law 227, (ii) By-law 111, (iii) By-law 172, (iv) Tenth Schedule, (v) By-law 184, (vi) By-law 186, (vii) By-law 183, and (viii) Seventh Schedule. Each By-law represents different fire safety requirements related to fire safety in cinema. This paper is only a preliminary findings. Further study is needed to identify the fire safety compliance in the cinema building. This will benefits for the building management in ensuring the safety of moviegoers in the cinema.

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