

FIRE SAFETY IN HIGH RISE RESIDENTIAL BUILDING IN MALAYSIA

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This project report is dedicated to My respected family  
Thanks for your pray, attention and spiritual support

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## ABSTRACT

With the increase in the high number of tall buildings being constructed in Malaysia, the building owners face many challenges. Not only the building owners will have to look after the maintenance of the buildings but they have also to consider the safety of the occupants, especially, in case there is a fire break out. The fire department will need the necessary equipment to 'fight' the fire and they need to be updated in the construction of these buildings. The aim of this study is to assess the fire safety regulation and also the factors taken into consideration in designing the fire safety requirements. The objectives of the study are to study the requirements of By-Laws 1984 (Malaysia) regarding the fire i.e. escape staircase, to identify the factors taken into consideration by building owners in term of fire regulation requirements, to assess the risk of fire in building and to evaluate the perception and behavior of occupants in case of fire outbreak. The study is focused on high-rise residential buildings with minimum of five storey's height. The data was gathered from observing five numbers of selected high-rise residential buildings in Kuala Lumpur. The data is also collected through questionnaires. From the study, the staircase width and intermediate floor depth are designed and constructed using different dimensions. There are five basic steps to carry out a fire safety risk assessment in buildings i.e. to identify fire hazards, identify people at risk, 'evaluate, remove, reduce and protect from risk', 'record, plan, inform, instruct and train' and review. The perception and behavior of occupants in case of fire outbreak is that they will immediately evacuate the building if the fire alarm goes off. The occupants wish to evacuate the building using the staircase instead of the elevator.

## ABSTRAK

Dengan peningkatan dalam bilangan yang tinggi bangunan tinggi yang dibina di Malaysia, pemilik bangunan menghadapi banyak cabaran. Bukan sahaja pemilik bangunan perlu menjaga penyelenggaraan bangunan tetapi mereka mempunyai juga menimbangkan keselamatan penghuni, terutamanya, dalam kes kebakaran. Jabatan bomba akan memerlukan peralatan yang diperlukan supaya boleh memadamkan api dan mereka perlu sentiasa memeriksa pembinaan bangunan-bangunan. Tujuan kajian ini adalah untuk menilai peraturan keselamatan kebakaran dan juga faktor-faktor yang diambil kira dalam mereka bentuk keperluan keselamatan kebakaran. Objektif kajian ini adalah untuk mengkaji keperluan Undang-undang 1984 Malaysia mengenai kebakaran iaitu tangga kecemasan, untuk mengenal pasti faktor-faktor yang diambil kira oleh pemilik bangunan dari segi syarat peraturan kebakaran, dan menilai risiko kebakaran di bangunan untuk menilai persepsi dan tingkah laku penghuni dalam kes kebakaran. Kajian ini memberi tumpuan kepada bertingkat tinggi bangunan kediaman dengan sekurang-kurangnya ketinggian lima tingkat itu. Data yang telah dikumpulkan dari memerhatikan lima bangunan kediaman bertingkat tinggi terpilih di Kuala Lumpur. Dari kajian tersebut, lebar tangga dan reka bentuk lantai dibina menggunakan dimensi yang berbeza. Persepsi dan tingkah laku penghuni dalam kes wabak api adalah bahawa mereka akan segera mengosongkan bangunan itu jika penggera kebakaran padam. Penghuni ingin keluar dari bangunan dengan menggunakan tangga daripada lif.

## TABLE OF CONTENT

CHAPTER	TITLE	PAGE
	<b>DECLARATION</b>	ii
	<b>DEDICATION</b>	iii
	<b>ACKNOWLEDGEMENTS</b>	iv
	<b>ABSTRACT</b>	v
	<b>ABSTRAK</b>	vi
	<b>TABLE OF CONTENTS</b>	vii
	<b>LIST OF TABLES</b>	xii
	<b>LIST OF FIGURES</b>	xiii
	<b>LIST OF APPENDICES</b>	xv
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Introduction	1
	1.2 Background of study	2
	1.3 Problem statement	3
	1.4 Aim and Objectives	4
	1.5 Scope of study	4
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>5</b>
	2.1 Introduction	5
	2.2 Definition of high-rise buildings	6
	2.3 Population and Housing in Malaysia	7
	2.4 The science of fire and fire spreading in building	8
	2.5 Definition found in various references	9

	2.6 Classes of fire	13
	2.7 Understanding the basic of chemical and physical nature of fire	15
	2.8 The stages of a fire	18
	2.9 Fire spreading in building	19
	2.10 Regulatory framework and escape routes Provision in the Uniform Building By-Law 1984 in Malaysia.	21
	2.11 Regulatory framework in Malaysia	21
	2.12 Managing residential buildings	23
	2.13 Defining fire safety	24
	2.14 Research on evacuation from the building	25
	2.15 Fire safety management background study	27
	2.16 Fire safety design framework	28
	2.17 Fire safety risk assessment in buildings	29
	2.18 Human Behaviour study	30
<b>3</b>	<b>RESEARCH METHODOLOGY</b>	<b>34</b>
	3.1 Introduction	34
	3.2 Research methodology overviews	35
	3.3 Research steps	38
	3.4 Questionnaires and analysis of variances	39
<b>4</b>	<b>OBSERVATION AND EVALUATION OF ESCAPE ROUTES CONDITION IN HIGH-RISE RESIDENTIAL BUILDINGS</b>	<b>40</b>
	4.1 Introduction	40
	4.2 High-rise residential buildings in Kuala Lumpur	41
	4.2.1 Building A	41
	4.2.2 Building B	42
	4.2.3 Building C	44
	4.2.4 Building D	45
	4.2.5 Building E	46

4.3 Analysis of the Escape Routes Design and Specification	48
4.4 Analysis of Staircases in Buildings Observed	48
4.4.1 Staircase steps analysis	49
4.4.2 Staircase tread dimension analysis	51
4.4.3 Step risers Analysis	53
4.5 Brief methodology used in research and analysis	54
4.6 Categorisation of issues encountered	55
4.7 Some important issues in evacuation processes	57
4.8 Problem encountered in high-rise residential buildings.	58
4.9 Structural design and construction	59
4.10 Staircase specifications do not comply with the minimum requirement	59
4.11 Corridor design and orientation	61
4.12 No fire doors at the storey exit	63
4.13 Facilities for fire safety in the building	65
4.14 Maintenance	66
4.15 Attitude of people	68
4.16 Management	71
<b>5</b>	
<b>HUMAN BEHAVIOUR RESPONSE ISSUES IN HIGH-RISE RESIDENTIAL BUILDINGS IN MALAYSIA</b>	<b>75</b>
5.1 Introduction	75
5.2 Brief of research methodology	76
5.3 Data Analysis	77
5.4 Frequency Analysis	77
5.5 Normalising data	79
5.6 Variables Priority and Weightage	80
5.7 Analysis of means	80
5.8 Buildings studied	81
5.9 Respondents' Background	81



	5.9.1 Gender	82
	5.9.2 Age groups	82
	5.9.3 Knowledge and experiences	83
	5.9.4 Education background	84
	5.10 Questionnaire survey results	85
	5.10.1 What would occupants of high-rise residential building normally do when they hear fire alarms or see fire cues?	85
	5.10.2 Occupants' perception and behaviour during building fire.	87
	5.10.3 When Fire Alarm Goes off	88
	5.10.4 Perception when fire alarm goes off.	90
	5.10.5 Factors most motivate occupants to evacuate the building in fire.	91
	5.10.6 Choice of exit and evacuation behaviour	91
	5.10.7 Factors that highly influence the occupants' behaviour during evacuation from building fire	93
	5.10.8 Human behaviour defined from the fire safety point of view	94
	5.10.9 Action to be taken by people during emergency situation	95
6	<b>CONCLUSION AND RECOMMENDATION</b>	<b>98</b>
	6.1 Introduction	98
	6.2 Conclusion	99
	6.2.1 Objective 1	99
	6.2.1.1 Staire case by-law	99
	6.2.1.2 Fire door by-law	99
	6.2.2 Objective2 : Fire regulation requirement factors considerate by building owners	100
	6.2.3 Objective3: Fire risk assessment	101
	6.2.4 Objective 4: Occupants perception about fire outbreak	103

6.3 Recommendations	105
REFERENCES	106
Appendix A	109

## LIST OF TABLES

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
4.1	Staircase steps analysis in observed building	50
4.2	No. of treads and percentage analysis	51
5.1	Overall response from respondents when they have seen fire cues.	78
5.2	Normalisation variables gap.	79
5.3	Percentage of variables ranking when alarm goes off	86
5.4	Factors that occupants' going to do first if they have seen fire cues.	88
5.5	Factors that occupants' going to do first if they have heard fire alarm.	89
5.6	Occupants' perception when they have heard fire alarm or someone yelled "FIRE"	90
5.7	Factors that will most motivate occupants' evacuation from building fire	91
5.8	Ranking factors in evacuation process during building fire	92
5.9	Factors influence the occupants' behaviour during evacuation.	94

## LIST OF FIGURES

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	The triangle of fire concept model [12].	15
2.2	The chain reaction process in burning material [12].	16
2.3	Fire behavior in compartment [12].	20
3.1	Research outline and process	38
4.1	Floor plan	42
4.2	Floor Plan of Building B	43
4.3	Floor plan for building C	44
4.4	Floor plan of building D	45
4.5	Floor plan for building E	47
4.6	(a) Emergency metal staircase, (b) Close view of staircase, (c) Tread measurement 234 mm	52
4.7	(a) Step riser designed at 198 mm, (b) Step riser design at 140 mm.	53
4.8	(a) Staircase view; tread and riser dimension is about the same size. (b) Tread dimension is only about 7 feet (185mm), whilst minimum requirement is 225mm at least. (c) Riser dimension is about 200mm, whilst maximum dimension should not exceed 180mm.	60
4.9	(a) Staircase width from wall to the handrail is about 3 ft 3 inch. (990). (b) Intermediate floor depth is about 2 ft 9 inches. Those dimension should be uniform i.e. staircase width and intermediate floor depth must be equalled.	61
4.10	(a) The original look of internal circulation where fire door unobstructed. (b) The flat owner has put up wall,	

	grilled and tiled the floor as a private space. (c) The flat owner put on a grill extended beyond his premises. This public area is illegally occupied.	62
4.11	(a), (b), are staircases without fire door.	64
4.11	(c), (d), and (f) are staircases without fire door. (e) Type of fire door should be fitted to those staircases.	64
4.12	Opening for natural ventilation and day-light designed in staircase shafts.	65
4.13	(a) Fire door with missing doorknob. (b) Type of doorknob supposed to be on the door. (c) Other door with missing doorknob. (d) Door with missing doorknob too.	68
4.14	(a) Double lock iron grill, (b) Items placed in corridor Obstruction to the evacuation process can happen if occupants put some of their items in escape routes. Figure 5.8 (a) and (b) show a bicycle, a motorcycle and furniture placed in a stairwell and corridor respectively.	70
4.15	(a) A bicycle placed in stairwell, (b) a motorcycle and furniture placed in corridor.	70
4.16	(a) Fire door locked with a padlock;(b) Fire door tied-up with a wire to the door frame.	71
5.1	Respondents' age groups	82
5.2	Respondents fire drill experience.	83
5.3	Respondents experience fire in building	84
5.4	(a) Respondents' education Background, (b) Regrouped Respondents' education background	84

**LIST OF APPENDICES**

<b>APPENDIX NO.</b>	<b>TITLE</b>	<b>PAGE</b>
A	To evaluate the perception and behavior of occupants in case of fire outbreak in high-rise residential buildings.	109

## CHAPTER 1

### INTRODUCTION

#### 1.1 Introduction

There have been numerous studies about fire safety in buildings and skyscrapers and have continued to be developed by many researchers for a considerable period of time, especially fire safety in the workplaces. Although there were some studies devoted on fire safety in tall buildings, there is still a gap on research about fire safety in high-rise buildings. Subsequently, the first seminar on human behavior in relation to fire incidents was held in 1977 at the University of Surrey, and eventually the seminar proceedings became the first published comprehensive book on human behavior relating to fire incidents [1]. Owing to the significance on the fire safety of building occupants, a second seminar was conducted in October 1978 by the National Bureau of Standards in the United States. Both meetings gave importance and focus on the examination and development of the various methods for the investigation of the occupants' behavior in times of fire incidents. Basically, the emphasis of this study is to define the behavior of the occupants during the occurrences of fire, the examination of the concept of *Panic Behavior*, and to explore the process of evacuation primarily on high-rise buildings [1]. In Malaysia, studies about fire safety of high-rise residential buildings are quite

new and very limited; thus, literature resources are scarce for review purposes in establishing a comprehensive assessment.

## **1.2 Background of study**

There have been numerous studies about fire safety in buildings and skyscrapers and have continued to be developed by many researchers for a considerable period of time, especially fire safety in the workplaces. Although there were some studies devoted on fire safety in tall buildings, there is still a gap on research about fire safety in high-rise buildings. The first seminar on human behavior in relation to fire incidents was held in 1977 at the University of Surrey, and eventually the seminar proceedings became the first published comprehensive book on human behavior relating to fire incidents [1]. Owing to the significance on the fire safety of building occupants, a second seminar was conducted in October 1978 by the National Bureau of Standards in the United States. Both meetings gave importance and focus on the examination and development of the various methods for the investigation of the occupants' behavior in times of fire incidents. Basically, the emphasis of this study is to define the behavior of the occupants during the occurrences of fire, the examination of the concept of Panic Behavior, and to explore the process of evacuation primarily on high-rise buildings. In Malaysia, studies about fire safety of high-rise residential buildings are quite new and very limited; thus, literature resources are scarce for review purposes in establishing a comprehensive assessment.



### **1.3 Problem statement**

In Malaysia, study on fire safety is very new, particularly research on provision of fire safety in high-rise residential buildings. The number of fire cases involved residential buildings is significantly high compared to other building types. Thus, escape routes in high-rise residential buildings should be designed and constructed to enable the occupants to evacuate the building as soon as fire has been detected.

By adopting observations approach, to investigate the issues and problems encountered in high-rise residential buildings. The numbers of high-rise residential buildings located in Kuala Lumpur observed so we should focus on the actual condition and problems encountered in escape routes in high-rise residential buildings in Malaysia.

However, discussion will be focused on the categorized issues which were highlighted during the research exploration, without mentioning a particular building where the problem was encountered. This is to avoid some degree of sensitivity in certain aspects especially when the rules and legislations are involved. Uniform Building By-Laws were used to consider the aspects of the requirements as they relate to escape route evaluate and fire safety in buildings. If we can understand the fire safety aspects, and we know what are the actual problems encountered in those buildings, appropriate measures can be taken to enhance fire safety standards.

#### **1.4 Aim and Objectives**

The aim of this study is to assess the fire safety regulation and also the factors taken into consideration in designing the fire safety requirements by means of following objectives:

1. To study the requirements of By-Laws 1984 (Malaysia) regarding the fire escape i.e. stair cases.
2. To identify the factors taken into consideration by building owners in term of fire regulation requirements.
3. To assess the risk of fire in building.
4. To evaluate the perception and behavior of occupants in case of fire outbreak.

#### **1.5 Scope of study**

The scope of this research is:

1. Only escape routes components i.e. staircase, corridor, fire door and intermediate floor are considered in analysis.
2. The study is focused on high-rise residential buildings with minimum of five storey's height.
3. Risk factors in building will be analysed according to the personal and damage hazards of fire as ruled out by Jabatan Bomba dan Penyelamat Malaysia.

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