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USER AWARENESS ON ACTIVE FIRE SAFETY EQUIPMENT IN COMMERCIAL BUILDING

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ABSTRACT

Fire safety is a critical aspect of building management, especially in high-occupancy spaces like shopping malls. This abstract is about user awareness about active fire safety and implementation of active fire safety in the case study building. Aim and objective has been set to achieve the study. The objective for this research is to identify the user awareness of active fire safety equipment and to observe the implementation of active fire safety equipment in Setia Ecohill Mall, Semenyih, Selangor. There have several problem statement which is there are death occurs by fire at shopping mall, ages factors are one of the big issues for the fire accident & related organizations are lack of awareness. The result and findings of the research was carried out by using quantitative data collection. Which is by distribute questionnaire and observing the site. The distribution of questionnaire was sent to the user and staff of the Setia Ecohill Mall, Semenyih, Selangor. The result based on the finding and data analysis in chapter 4 had given the result that most of the respondents aware about active fire safety. Meanwhile from the observing for objective 2. The implementation of active fire safety equipment is satisfied. The major findings is that majority of the users of the mall are aware about the active fire safety equipment.

Keywords: *active fire safety, awareness, setia ecohill mall, Semenyih*

INTRODUCTION

Fire is the element that can be good and bad for people. Fire sources are important for our generations. This element is used for many things such asconstructions, cooking, baking, manufacturing etc. There is no denying that fire elements can be bad for people. It can cause injuring and even death. The occurrence of fire is by combined of oxygen, fuel, and heat. There are many factors of fire spread which is distance, severity, fire resistant, combustibility and weather. The behaviour of the fire often depends on the fuel. Other factors or variables may includewhere the fuel is situated and how near it is to other fuels, the oxygen concentration.The characteristics of fire, there are 2 types which are flammable and non-flammable.

In Malaysia, all building need fire safety that must comply with the Uniform Building By – Law (UBBL) 1984 and provide all the required safety features. The building thatare not compliance with UBBL can give high risk and hazardous to the occupants because the building is not in good performance in safety.

Definition of fire safety, the action of safety for the human and equipment provided for specific occupancy areas and function or situation to work against potential fire hazard and fire risk. Fire can have a devastating impact on anybody who is unfortunate enough to be near it. We all know that the flames and heat from a fire can cause a great deal of harm from breathing the hot air killing a person instantly tolife threatening or life changing burns on the body (Dawn Evans, 2017). There are 2types of fire safety which are passive and active fire safety. In this study, were focusonly on active fire safety. Active fire protection is basically a manual or automatic fireprotection system, such as fire alarms, detectors, risers, hose reels, sprinklers, etc., that warns of the occurrence of a fire, contains, and extinguishes the fire. Providing suitable and suitable facilities to support rescue and firefighting operations is also partof a proactive fire prevention strategy. Fundamentally, Active fire protection taking down fires directly, whether controlling, suppressing, or extinguishing it. Equally important is the integration of the alarm system into the fire protection system. The action is also evaluated as active firefighting when the alerted fire brigade arrives. (Palcon, 2019).

LITERATURE REVIEW

Fire events would have serious consequences for victims on a worldwide scale. Over time, there has been a dramatic rise in the number of fire accidents in Malaysia. Most property loss incidents affected residential structures and left people badly injured. Given that the main advantages of residence ownership are shelter and security for the occupants, this scenario raises issues for national development.

Additionally, there are still not enough fire safety precautions in place, particularly for landed residential homes. The National Fire and Rescue Department of Malaysia has recently undertaken seminars, campaigns, and trainings on fire safety all around the country. These fire prevention methods, however, failed in raising the public's understanding of fire safety. Perhaps we ought to bear in mind how crucial it is to raise public knowledge of fire safety (Azim Sulaiman, 2012).

An active fire safety equipment is in use indicates some sort of activity to eliminate the fire from growth. This action may be manually used by one or more people musttake it, or automated, in which case it was acting as soon as heat, smoke, or fire is detected. The majority of active systems are made to directly stop the fire, striving toassist put it out. An instance of an active fire suppression system is what were in useafter the fire department shows up. Installing active fire safety equipment often depends on factors like building size and population.

There is much equipment for active fire safety that can be included in the building. Residential and commercial building. These two types of building are different in terms of active fire safety equipment. Commercial buildings will have more types of active fire safety equipment because commercial buildings are mostly big and have more occupants. There were manual and automatic devices of active fire safety equipment. The automatic devices can be triggered automatically. Meanwhile manual devices can be used by the occupants to prevent fire to growth.

For fire safety at the mall, majority people will visit shopping malls, therefore it is important to have proper fire safety precautions in place. Sprinklers, smoke control, signs, and alarms were among the fire safety precautions mentioned by Hayward (2012), for shopping malls. According to Tabassum et al. (2013). Nearly all shopping malls have smoke detectors, hydrant systems, fire extinguisher, exit signs and symbols; nevertheless, the means of escape and firefighting equipment that are present in nearly all buildings are not sustained to code. After a shopping mall installa sprinkler system, according to Hayward (2012) advised that for the system to function correctly, frequent maintenance and testing are required.

Shopping mall users need to aware about active fire safety at the mall. They need to understand and know to use manual active fire safety especially such as fire extinguishers, water hose etc.

Fire Safety Criteria

According to Azim Sulaiman (2006), fire can be defined as a form of combustion. In the words, fire can be described by self-sustaining burning of combustible fuel resultsin a dazzling light and a significant quantity of heat, which are together referred to as fire in linguistic terms. Fire technically is not a state of matter. Instead, is an exothermic oxidation process that releases energy in the form of heat and light. Contrarily, combustion is described as the burning process in which a chemical change, often oxidation, occurs along with the creation of heat and light.

Safety Fire safety can be achieved by handling flammable components such as solids, liquids, and gases within the environment. Since combustible materials are limited, it is possible to suppress the growth of fire in the event of a fire. Structural stability also plays an important role. Because this is the only way firefighters can safely and smoothly carry out rescue operations (G.F Marantika, 2020).

The construction load and the load-bearing capacity of the components are very important. Fire can be one of the loads that must be protected by structures. Properly installing an effective fire protection system in a building can extend the life of the building.

Although buildings are adequately with fire safety equipment, fire hazards continue to pose the greatest threat to the life of the occupants, safety and property of everyone living in a given community. Critical components rely on fire protection systems and fire prevention equipment, which must meet standard to ensure the safety of structures and their occupants. However, raising people's awareness of firesafety might unavoidably reduce the harm or incidence in the case of a fire (M. Taib,2014).

Types of Active Fire Safety Equipment

Active fire protection systems require initiation actions in response to fire. Response actions can be performed manually such as fire extinguisher or automatically such as sprinkler system. Fundamentally, active fire protection means directly stopping the growth of a fire, whether by suppression, control, or extinguishing. Equally importantis the incorporation of an alarm system into the fire protection system to alert the occupants to escape and to calling the fire fighter to arrive.

The arriving of fire department will continue to stop the fire with active fire safety equipment. (Palcon, 2019) From this, Active fire safety equipment have two types which is manual and automatic. These two types are important that need to install in the building. Other than that, Fire detection. This also is the types of active fire safety equipment. This type is for signal the occupants of danger of fire in the building suchas smoke detector, heat detector, flame detector etc.

Table below is example of common active fire safety that are always located on every single building: -

Table 1: Example of Common Active Fire Safety Equipment

Figure	Description
 Figure 1: Fire Extinguisher	A fire extinguisher is a portable active fire extinguishing device, typically dry orwet chemical filled, used to extinguish, or extinguish small fires. Fire Extinguisher have 5 types A to E.
 Figure 2: Fire Alarm	fire alarm systems, multiple devices work together to detect smoke, fire,carbon monoxide, or other emergencies and alert people through visual and auditory devices..
 Figure 3: Sprinkler System	A sprinkler system is an active fire protection method consisting of a water supply system
 Figure 4: Water Hose	The hose reel system, which consists of hose reel pumps, a fire water tank, hose reels, pipe work, and valves, is designed for use by the occupants during the initial stages of a fire.

Knowledge of Fire Safety Measures

The property and people were protected from loss due to a fire by being aware of andable to apply the building's fire safety equipment. Rahim et al. (2014) noted that respondents' awareness levels were relatively low because most of the evaluated criteria showed only moderate effectiveness. According to Kachenje et al. (2006), 41% of building users are unaware of the available means of escape in the event of a fire, and 60% of building users are unable to operate the facilities.

According to Hayward (2012) revealed that in one study, respondent was given six different signs to read. While everyone understood the "NO SMOKING" and "EMERGENCY EXIT" signs, which featured a man running, only 53% of respondents understood the sign for a fire hose, leading researchers to the conclusion that only half of the population can read such signs.

METHODOLOGY

This research project is using a quantitative survey method for data collection and analysis. Quantitative research survey method is a type of research design that involves collecting numerical data through structured methods and standardized, such as make a questionnaire etc. The aim of this research method is to gather datathat can be analyzed using statistical techniques to describe relationships, patterns, and trends in the data.

The data were collected by two source which is primary and secondary resource. For primary source by site visit and give questionnaire to occupants and staff that use the case study. Meanwhile secondary source is by journal, articles etc. After the collectionof data, the data gathered were tested and analysed thoroughly. The conclusion wasdrawn along with recommendation.

The target respondents were 80 respondents which is the user of the mall and staff.

Data Analysis and Discussion

The aim of the research is to identify the user awareness about active fire safety and observe the implementation of active fire safety equipment at the case study. The questionnaire were distributed for collecting the data for objective 1. Meanwhile a site visit and checklist were conduct for collecting data objective 2. The question will be divided in 3 sections which is in section A was respondent background. Next, section B is mall visitor awareness of active fire safety and section C is performance of this mall in preventing fire accident.

The case research results, and analysis were refined. Following that, for the section A about demographic data regarding the respondents' background. Following that, section B is awareness of active fire safety by mall visitor and staff of the mall, Last, section C about performance of the mall in preventing fire accident were questioned in the questionnaire.

Background Case Study

Figure 1: Front View Setia Eohill Mall

Figure 2: Location Plan for Setia Ecohill Mall

The case study building id Setia Ecohill Mall located at Semenyih, Selangor. The building was built in 7 February 2019. The building has been built about in 4 years. The building are 3 storey building and including lower ground. This building are developers by SP Setia Sdn Bhd. This building type is a Commercial building. The mallis designed with a contemporary and eco-friendly approach. It offers a diverse rangeof retail outlets, dining options, and entertainment facilities. This research for this building has started in early of year 2023. For this case study research there are about a week have visiting this building for collecting data and information.

Data Analysis

Identify the User Awareness on Active Fire Safety Equipment In Setia Ecohill Mall

For this objective, the data collecting was conduct by distribute the questionnaire tothe user and staff of the Setia Ecohill Mall, Semenyih, Selangor. The questionnaire has 3 section which section A about demographic respondent background, sectionB about user awareness on active fire safety equipment in Setia Ecohill Mall and section C about performance of this mall in preventing fire accident

Section B

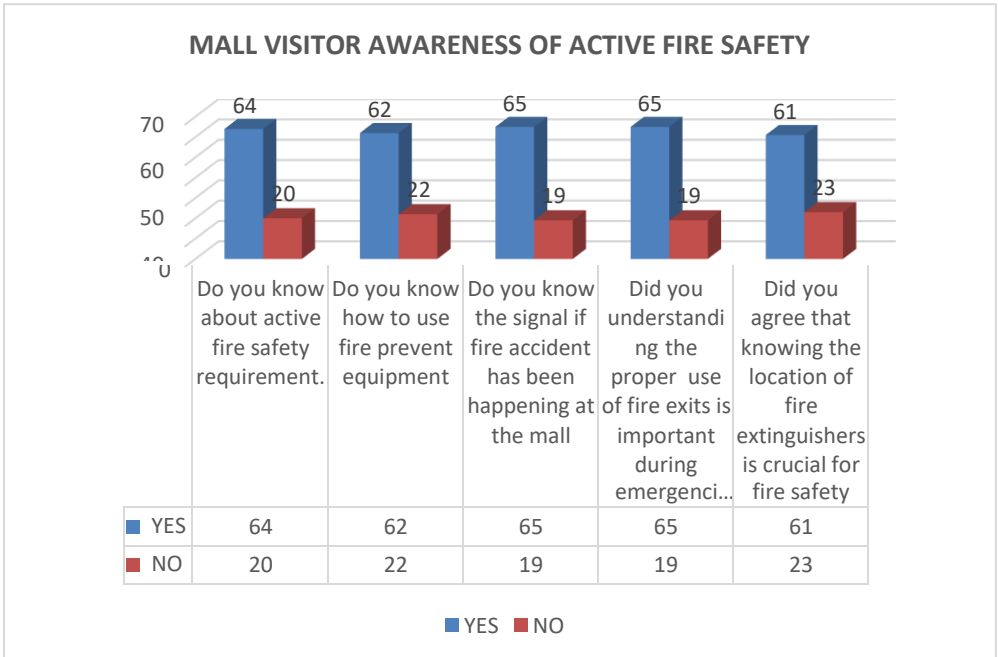

Figure 3 : Mall Visitor Awareness of Active Fire Safety

The figure above is about respondent choose between yes and no for 5 questions that have been distribute to the respondents. Which first question is ‘Do you know about active fire safety requirement’. Next question is ‘ Do you know how to use fire preventing equipment’. Meanwhile, the third question is ‘ Do you know the signal if accident has been happening at the mall. Forth question ‘Didyou understanding the proper use of fire extis is important during emergencies. Lastly, ‘Did you agree that knowing the location of fire extinguishers is crucial forfire safety’.

Section C

Table 2: Performance of this mall in preventing fire accident

STATEMENT	RATING SCALE				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Mall has proper exit route for the occupants to access	3	7	22	25	27
I see fire prevents equipment iseasy to get for this building	4	7	20	31	21
I feel confident with the performanceof active firesafety of this mall	3	4	26	27	24
I see the building hasclear and visible fire exit signs	3	8	20	32	21
I know the building hasa well-maintained fire alarm system	3	5	22	28	25
TOTAL	**16**	**31**	**110**	**143**	**118**

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The table above is about respondent choose between 1 -5 in Likert scale about questions about performance of this mall in preventing fire accident. For the first questions is about ‘ Mall has proper exit route for the occupants to access’. Next, ‘ I see fire prevents equipment is easy to get for this building’. For the third questions is‘I feel confident with the performance of active fire safety of this mall’. Meanwhile, forth questions is about ‘I see the building has clear and visible fire exit signs’. Lastly,‘I know the building has a well-maintained fire alarm system’.

The Implementation of Active Fire Safety Equipment InSetia Ecohill Mall, Semenyih, Selangor

For this objective, the data collecting is based on site visit by observing the implementation of active fire safety at this case study. What types of active fire safetythat has been put at the case study. There have 8 active fire safety equipment that are located at Setia Ecohill Mall, Semenyih, Selangor which is fire alarm, Smoke Detector, Sprinkler System, Fire Extinguisher, Water Hose, Fire Resistant Door,Exit Signs and Smoke Spill System. This building has 4 level. The third level is closed notopening yet. The quantities of all of the equipment were take note. There were haveindication plan that present the location of the equipment from level LG, 1st floor and2nd floor.

RESULT AND FINDINGS

Identify the User Awareness on Active Fire SafetyEquipment In Setia Ecohill Mall

Result For Section B Mall Visitor Awareness of Active Fire Safety

Result for section B, the questions are asked in two options answer given which is Yes and No. These types of answer can identify the respondent which is they are aware about active fire safety or not.

For the first question 'Know about active fire safety requirement'. The respondent is highly known about active fire safety requirement. There have 64 respondent that tick Yes. Meanwhile for the respondent that tick No are only 20 respondents. This showsthat the occupants are mostly know about active fire safety requirement. For the nextquestion 'Know how to use fire prevent equipment'. Overall, the respondent that tickYes is 62 respondents. Meanwhile for the respondent that tick No is 22 respondents.For this question, that have been stated that occupants are mostly know how to usefire prevent equipment such as fire extinguisher, water hose etc.

Next, 'Know the signal if fire accident has been happening at the mall'. These questions have been answers by 84 respondents. The respondent that ticks Yes are 65 respondents. Meanwhile, for No are tick by 19 respondents only. The difference is high. The respondent is mostly knowing the signal if fire accident happens. Other than that, the statement for 'Understanding the proper use of fire exits is important during emergencies' has many respondents that choose Yes which is also 65 respondent and 19 respondent that choose No. This shows that the occupants mostlyunderstanding the proper use of fire exits is important.

Lastly, 'Knowing the location of fire extinguishers is crucial for fire safety'. These statements have been answers by 84 respondents. The respondent that ticks yes have 61 respondents. Meanwhile for the opposite only 23 respondents. Overall, many respondents stated that knowing the location of fire extinguishers is crucial for fire safety.

From all the questionnaire, the respondents are mostly aware about fire safety. Thereare majority of the respondent that tick Yes for all the questionnaires. These shows that the respondent still aware about fire safety. These finding highlight that the residents of Semenyih that are use of this building is aware about active fire safety.

Result For Section C Performance of This Mall in Preventing Fire Accident

Table 3: Table of Average Mean Index

STATEMENT	RATING SCALE					AVERAGE MEAN INDEX
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	
Mall has proper exit route for the occupants to access	3	7	22	25	27	3.79
I see fire prevents equipment is easy to get for this building	4	7	20	31	21	3.73
I feel confident withthe performance of active fire safety of this mall	3	4	26	27	24	3.77
I see the building has clear and visible fire exit signs	3	8	20	32	21	3.71
I know the building has a well-maintained fire alarm system	3	5	22	28	25	3.82
TOTAL	**16**	**31**	**110**	**143**	**118**	**-**
AVERAGE MEAN RESULT						**3.76**

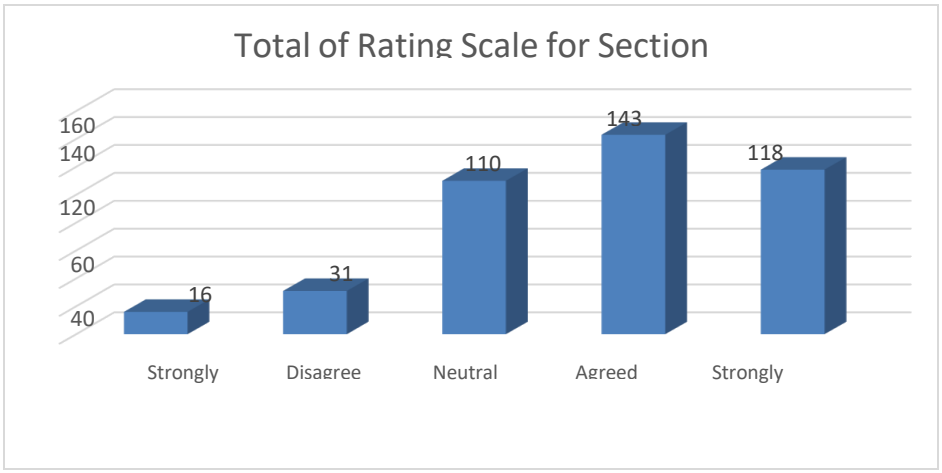

Figure 4 : Total of Rating Scale for Section C

The data provided is represents the responses of the respondents to a Likert five questions. Scale for statements related to performance of this mall in preventing fire accident. The responses are into five scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). The average mean index has also been calculated for each statement, which presenting the average numerical value assigned to the response options.For the first statement, 'mall has proper exit route for the occupants to access' the average mean is 3.79. The respondents strongly agree about this statement. The respondents feel that this mall has proper exit route for the occupants to access. Next,'I see fire prevents equipment is easy to get for this building'. The average mean index for this statement is 3.73. Majority of the respondents is agreed and strongly agreed with this statement. Even though, this statement index in slightly low than a statement above.Regarding to the statement of 'I feel confident with the performance of active fire safety of this mall'. The average mean index is 3.77. It is a little bit higher than the statement above. The majority for this statement. The respondent has chosen from neutral scale to strongly agreed. For the next statement, which is 'I see the building has clear and visible fire exit signs.' The average mean index is 3.71. For this statement it is the lowest mean index compared to others statement.

Lastly, 'I know the building has a well-maintained fire alarm system'. The average mean index for this statement is 3.82. This is the higher mean index from all the statement. This suggest that the fire alarm system is well-maintained because of thisbuilding is new.

Overall, this analysis exposes that majority of the respondents are highly agreed withall the statement above. There are all aware about active fire safety and aware aboutthe performance of the building about fire safety. These findings highlight that the users of this mall aware that this building performance about fire safety is great.

THE IMPLEMENTATION OF ACTIVE FIRE SAFETY EQUIPMENT IN SETIA ECOHILL MALL, SEMENYIH, SELANGOR

The table below is the total of all the active fire equipment that located at Setia Ecohill Mall: -

Table 4: Table of All Active Fire Equipment

Bil	Items	Quantity
1.	Fire Alarm	25
2.	Smoke Detector	27
3.	Sprinkler System	55
4.	Fire Extinguisher	41
5.	Water Hose	16
6.	Fire Resistant Door	10
7.	Exit Signs	19
8.	Smoke Spill System	3
	TOTAL	196

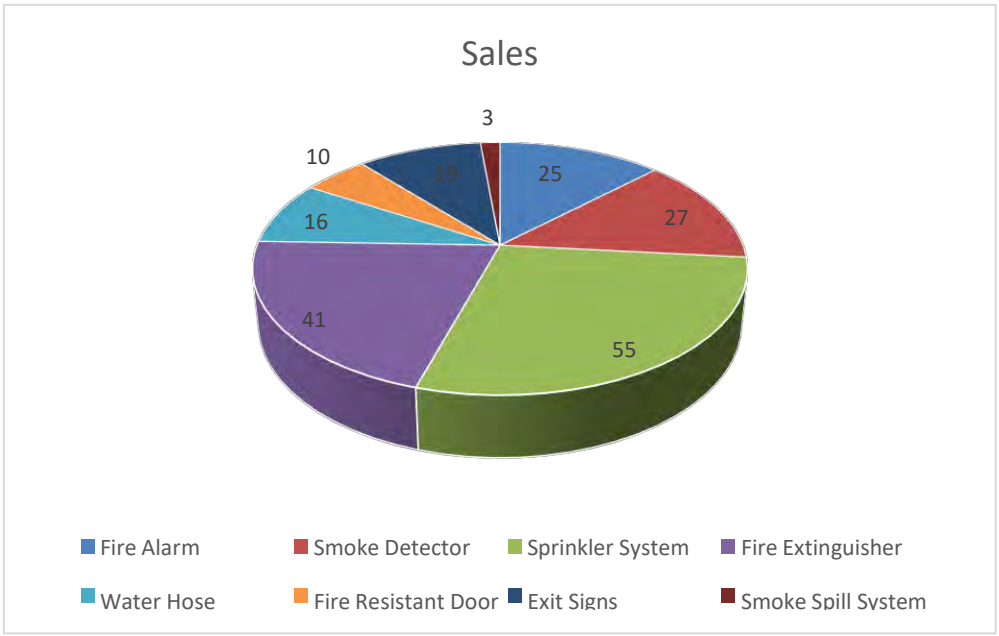

Figure 4 : Active Fire Safety Equipment

From the table and chart above, the total of the active fire equipment at Setia EcohillMall has 196. But there have several places that are limitations which is the observingcannot be conduct. For the 3rd floor, the floor are does not open yet.For the first active fire equipment items which is fire alarm. The total of this items at this case study is 25 quantities. From the three of the floors, fire alarm is mostly at the LG floor which is 11 quantities. For the 1st floor there have 8 and for the 2nd floor has only 6 quantities. Next, smoke detector. These items have 27 quantities. The level that are mostly these items are attach is at the LG floor which is 12 quantities. For the 1st floor there have only 6 meanwhile the 2nd floor have 9 quantities.The active fire equipment for sprinkler system is the most quantities that have at theSetia Ecohill Mall which is 55 quantities. At the LG floor have the most quantities forthese items which is 28 quantities. For the 1st floor there have only 12 and 2nd floor there have 15 quantities. Other than that, fire extinguisher is one of the most important items have at this building. The total is quite incredible which is 41 quantities. Theseitems can be found mostly at the 1st floor which is have 18 quantities. Meanwhile for the 2nd floor has 13 and lastly the level LG has only 10 quantities.

For the next active fire equipment is water hose. The total of this items is 16 only. The quantities are not that many but adequate. At LG floor and1st floor the quantity is similar which is 6 quantities each level but for the 2nd floor the quantities are decreaseto only 4. Other than that, fire resistant door. The total of this items is 10 quantities. At LG floor and 1st floor the quantity is similar which is 3 quantities each but for the 2nd floor it increases to 4 quantities of the fire-resistant door.

For the exit signs, the total of this items is 19 at this building. The most items can be found is at the 2nd floor which is has 9 of exit signs. For the 1st floor there have 6 quantities and for the LG floor there are only 4 quantities. Lastly, smoke spill system. It only found at the LG floor which is 3 quantities. These items are located at the parking only. The quantities are the lowest compared to any other active fire equipment.

Overall, all the equipment is adequate for the size of this building but there have several active fire safety that can be put in this building. This building is new which is all the active fire safety is in a good condition.

CONCLUSION

This research data and information are obtained by literature review, observing, questionnaire, checklist etc were used to obtain data for this research. This research is focusing on user awareness about active fire safety equipment at case study building and the implementation of active fire safety equipment at the case study building. The case study building is Setia Ecohill Mall, Semenyih, Selangor. The aims are to achievement the objective. There also will have recommendations for improving. The recommendation is by placing an active fire safety equipment that are does not have at the case study building. There have several active fire safety that are suitable to put at the commercial building especially mall. For example, stairwell pressurization system, Foam suppression system & fire alarm pull system. These are the active fire equipment that are suitable for mall.

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3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

nar

Setuju.

27.1.2023

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