DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

FIRE PROTECTION SYSTEM AT TNB PASIR GUDANG

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(PERAK)

FEB 2022

It is recommended that the report of this practical training provided

By

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2019274434

entitled

Fire Protection System at TNB Pasir Gudang

be accepted in partial fulfillment of requirement has for obtaining Diploma in Building.

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STUDENT'S DECLARATION

I hereby to state that this report is my own work that I have been working throughout my practical training journey. Every objective of gaining more knowledge and honing my skills is successfully reached as I have undergone my practical training at EME Resource Sdn Bhd for about 20 weeks starting from 23rd August of 2021 and ended on 07th January of 2022. However, for extract and summaries in which the original references stated herein is exceptional. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

…….

Name : Siti Syahlizah Binti Zainal

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Date : 10th January 2022

AKNOWLEDGEMENT

To begin with, I would like to thank to Allah as finally I was able to finish this report that was assigned for me with successfully by His guidance and His Blessings.

I wish to express my sincere gratitude to the following incredible people for their guidance, wisdom and their willingness to open their arm in helping me through the training period. First and foremost, warmest thanks to Encik Kamarul bin Shahriman and Encik Abdul Karim bin Abd Rahim as they accepted my request to do a practical training at their company. Not to forget, their professional team which is included Puan Noor Fazirah binti Ali, Encik Othman bin Abd Halim, Encik Ahmad Amirul Alif and the rest of the team that helped me learn and develop my understanding and knowledge. This is because without their encouragement and supports, this report might be unable to be done properly.

Next, I would like to thank all of the UiTM lecturers who have taught and nurtured me as a student and person. I also want to express my heartfelt gratitude to the lecturers who were directly involved in my training. I am very appreciating all the time, effort, encouragement and ideas that Ts. Wan Akmal Zahri Wan Zaharuddin, my Supervising Lecturer, Dr. Nor Asma Hafizah Binti Hadzaman, Practical Training Coordinator, and Dr. Dzulkarnaean Bin Ismail, Programme Coordinator that have contributed to the successful completion of my training, this report, and the valuable knowledge that have been shared over the last few semesters.

ABSTRACT

The purpose of this internship report is to write down the detail of my journey throughout the industrial training that are done at EME Resource Sdn.Bhd, Johor Bahru, Johor. This report is based on my internship in this company for about five months which started from 23rd August 2021 till 7th January 2022.

The undergraduate students from Department of Building Universiti Teknologi Mara Kampus Seri Iskandar Cawangan Perak, are compulsory to attend 20 weeks Industrial Training during the period of their study. The purpose of this industrial training is to expose the students to the world of careers and working environment. Besides, this internship is also offering a chance for them to apply all the knowledge they have learnt in the lecture room during their training. The main goal of this industrial training is to boost student's knowledge and their skills in the profession in line with the graduates with professional, ethical, skilled, creatives and competent.

Other than that, there are also unmentioned objectives of industrial training such as to expose the students to the environment and working condition in their respective field, to use the knowledge of the industrial training that might be useful in the study, to train the students to interact and communicate effectively at all levels in the workplace and to appreciate the ethical values of their profession. For 20 weeks industrial training at EME Resource Sdn. Bhd, the objective and the purpose of the training had been achieved successfully. Student had been implanting suitable knowledge and also the ethic of building study. Then, there are many trainings conducted at the company and the related knowledge will help the students to carry the job more effectively. Meanwhile, the student also given a chance to get involved in the building daily job that can be useful in the future. As a summary, the company is also playing an important role to guide the students in complete their internship.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

To begin with, in order to prioritize human lives and the property; a fire fighting system is undoubtedly the most significant part of the building services. A fire can spark in an instant and spread within seconds that have a possibility to sweep all the livings and the non-livings off. By the reason of that, firefighting system should be placed regardless the type of the building in order to reduce the damage. Another reason is, without them the lives of those inside the building are placed at high risk during an emergency. As an old folk says, prevention is better than curing.

The functionality of fire protection systems is important to understand as the systems work in different ways, yet they all still have a common goal which is to detect a fire and protect the building, its occupants, and valuables. Smoke detector and a sprinkler both are known as the most common fire protection system where the smoke will set off the detector immediately upon the fire sparks and causing the sprinkler system to activate. Although using them both is such an effective method which the water protects against the spread of fire, but dealing with certain critical equipment or special hazards, it is way better to use automatic fire suppression system that contained clean agents as they can detect and suppress fire without leaving any residue. There are a lot of things everyone should know and learn about fire protection system; thus, the aim of this report is to discover a deeper facts of fire protection system.

1.2 Objective of Studies

i. To identify the types of fire protection installed at TNB Pasir Gudang.
ii. To investigate the operation of fire protection system in the building.
iii. To determine the inspection and test of fire protection system.

1.3 Scope of Study

Fire protection system can be divided into two classes which is passive and active fire safety system. However, the scope of study is only focused on the types of active fire protection system that used at TNB Pasir Gudang, Johor. Besides of learning every each of type, this report is also point out its operation, and explained why a regular inspection and maintenance is important.

1.4 Method of Study

There are some of the study methods that were applied in order to obtain the information that need to be included in this report, which are categorized in primary and secondary method. Primary sources are materials that have not been processed or printed, that's mean the information that have been collected is still in original condition and have not been interpreted. There are two types of method that have been applied for the primary sources in which observation and interview method.

i. Observation method

The observation is done by having a site visit. The observation is also supported by using a camera to shoot the pictures; so that it can be one of the materials evidence to show the progression of work.

ii. Interview method

Next is, conducting an interview with an experienced person is very helping in collecting more information about the project. For example, asking the supervisor or the technician who is in charge about how important to inspect and do testing on fire protection system regularly. Since they are more experienced and involved in the current project, they must know better than anyone else.

The secondary source is usually by reading the written material, to be exemplified it is including the magazines, journals, blogs, and etc. These types of sources are usually has been processed, printed, and publicized to the public. So, it is easier to obtain more information by clicking every key on the keyboard. Moreover, when still in the pandemic, stays at home is definitely the best way to keep the social distancing. Besides, collecting the information by referring the drawing and document from the office is also giving such a big help to do this report.

iii. Document reviews

Document review is obviously the most accurate data that can be collected since referring the information that have been obtained right after the work progression. For example, the progress report where it is including a picture, the operating procedures and also the current condition of the fire protection systems.

iv. Journal/Blog

Reading a journal or a blog is also helping in collecting a bunch of information, since there are a lot of types of journal and blogs on the internet, compare them and choose the bests one. By doing this activity it helps in gaining more knowledge since have to do a lot of reading.

CHAPTER 2

COMPANY BACKGROUND

2.1 Introduction of Company

EME Resources Sdn. Bhd. is a mechanical and electrical engineering services' company that founded in 2013 in Johor Bahru. Recognising the potential and needs of efficient mechanical and electrical engineering services provider in Malaysia, the founders have been steering the company steadily forward from its inception; first in the efficient energy management services, steam engineering, mechanical piping, electrical, process control then progressing to firefighting and protection systems. With growth and having such a core staff of engineers, the company has added even more services, from boiler servicing, utility pipe works, to firefighting system, construction and more, to offer clients a wide range of engineering services, maintenance, construction, fabrication, consultancy, and various value-added services according to industries need. Other than that, staff are regularly kept up to date on the latest technology and hands-on training is an absolute must.

Armed with these strengths, EME Resources is well poised to provide Malaysia as well as the international market the technology and services required by various sectors and industries.

2.1.1 Vision

"We aim to become a sustainable engineering construction company with complete in-house capability in the design, supply, and construction of civil, structural and M&E infrastructure in the region."

2.1.2 Scope of Work and Services

i. Mechanical & Electrical Engineering

EME Resources Sdn. Bhd. has the in-depth expertise and knowledge in steam generation system, design of efficient steam system, services, maintenance, and steam engineering consultancy. Possesses wide experience in utility pipe works for various services such as steam, chilled water, process water, wastewater, treated water, compressed air system. Vessel's fabrication, supply, install, maintenance, test, and commission are also part of the core company activities.

ii. Fire Fighting and Protection Services

Certified distributor and installer of Aerohub^{TM}, new generation of aerosol fire suppression system and Orient Corp. Pte. Ltd. FM200, Clean Agent Fire Suppression system. The best, effective and reliable replacement for Halon and CO_2 fire suppression system due to its excellent characteristics in ensuring human safety and health. EME is also the distributor and installer of Context Plus CTEC ZFP Analogue Addressable Fire Alarm Panel, the latest technology of fire protection system in the market.

iii. Building Services, Maintenance, Cleaning and Civil Works

EME Resources able to deliver various steel structural works, plumbing, electrical wiring, landscaping, cleaning and firefighting installation maintenance and services. The company has also the expertise to execute various civil works such as drainage works, sewage treatment plant construction and the supplier of Thermal Coating product CLIMATE ACTIVES PAINT.

They are also possessing the expertise and trained in building and plant sanitation and cleaning activities. These are proven by the number of years and experience possessed by their key personnel in food manufacturing plants and pharmaceutical industries.

2.2 Company Profile

Figure 2.1: company's logo

Name	:	EME Resources Sdn. Bhd.
Company Reg.	:	1066364 M
Business Address	:	No. 42, Jalan Kempas Indah 1/1, Taman Kempas Indah, 81300 Johor Bahru, Johor Darul Takzim.
East Coast Branch	:	No. 34, Lorong Balok Perdana 3/3, Balok Perdana. 26100 Kuantan, Pahang Darul Makmur.
Email	:	emeresource@gmail.com
Account No.	:	EME RESOURCES SDN. BHD **551146524322**
EPF Registration No.	:	19739481
MOF Registration No.	:	357-02239611
SST ID No.	:	J31-1902-32100002

2.3 Company Organization Chart

The company is handled by two best friend which is Encik Kamarul Shahriman and Encik Abdul Karim. This company is located at No. 42, Jalan Kempas Indah 1/1, Taman Kempas Indah, Johor Bahru and also have another branch placed at No. 34, Lorong Balok Perdana 3/3, Balok Perdana, Kuantan. Therefore, below is the company organization chart;

2.4 List of Projects

2.4.1 Completed Projects

Table 2.1: List of Completed Project

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1	*Kerja-kerja membekal, menaiktaraf, menguji serta menguji terima. Sistem penggera kebakaran dari jenis konvensional kepada jenis addressable di keseluruhan tingkat bangunan, sistem pencegah kebakaran co2 kepada jenis aerosol, 4 unit 'smoke spill exhaust fan' kepada "stair pressurization system" dan paip utama sistem "hose reel di Blok B Wp Johor Bahru.*	RM 375,000.00	30/6/2018	20/1/2019	6 – 7 Months	AMBANG WIRA CORP. BHD.
2	Supply and install new fire suppression system, clean agent aerohub aerosol at bunker simpanan peluru, TLDM, Tanjung Gelang, Kuantan for Messrs. Hub Technology Sdn. Bhd.	RM 18,150.00	9/7/2020	15/12/2020	5 – 6 Months	MESSRS. HUB TECHNOLOGY SDN. BHD.
3	Supply and replace main fire alarm panel motherboard at Cryovac (M) Sdn. Bhd.	RM 9,344.00	6/8/2021	30/9/2021	1 – 2 Months	CRYOVAC (M) SDN. BHD.

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
4	Trouble shooting and make good main fire alarm panel for bomba fc inspection at Fgv Biotechnologies Sdn. Bhd. Kuantan	RM 12,230.00	15/9/2021	23/9/2021	9 Days	FGV BIOTECHNOLOGIES SDN. BHD.
5	*Kerja-kerja perkhidmatan penyelenggaraan sistem kebakarann pemadam api automatik dan mudah alih serta perkakasan yang berkaitan di Pencawang Masuk Utama, Grid Maintenance Selatan, Bahagian Grid, Tenaga Nasional Berhad, untuk tempoh 1 tahun (1 pusingan): Pakej A-Akrh*	RM 28,213.00	25/9/2020	24/9/2021	1 Year	TNB AYER KEROH, MELAKA
6	*Kerja-kerja perkhidmatan penyelenggaraan sistem kebakaran pemadam api automatik dan mudah alih serta perkakasan yang berkaitan di Pencawang Masuk Utama, Grid Maintenance Selatan, Bahagian Grid, Tenaga Nasional Berhad, untuk tempoh 1 tahun (1 pusingan): Pakej C-Klug*	RM 63,244.00	25/9/2020	24/9/2021	1 Year	TNB KELUANG, PAHANG

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
7	*Kerja-kerja perkhidmata penyelenggaraan sistem kebakaran pemdam api automatik dan mudah alih serta perkakasan yang berkaitan di Pencawang Masuk Utama, Grid Maintenance Selatan, Bahagian Grid, Tenaga Nasional Berhad, untuk tempoh 1 tahun (1 pusingan): Pakej D-Sban*	RM 51,628.00	25/9/2020	24/9/2021	1 Year	TNB SEREMBAN, NEGERI SEMBILAN
8	*Kerja-kerja pembaikan alat pemadam api dan sistem pencegah kebakaran di Pencawang Masuk Utama Bagi Jabatan Grid Maintenance-East, Subzone Kuantan Bahagian Grid, TNB*	RM 108,560.00	11/8/2021	4/10/2021	1 – 2 Months	TNB SUBZONE KUANTAN
9	*Kerja-kerja membaikpulih system peralatan pencegah kebakaran sedia ada di Gudang Simpanan Jasin Melaka & Stor Tempatan Kempas, Johor.*	RM 105,930.00	8/12/2021	24/12/2021	3 Weeks	TNB JASIN, MELAKA & KEMPAS, JOHOR

2.4.2 Project in Progress

Table 2.2: List of Project in Progress

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1	Inspection, service, and maintenance of the firefighting equipment at Petronas Dagangan Berhad (PDB) Terminals & Regional Office - Southern Region	RM 1,500,000.00	June 2021	2024	3 Years	PETRONAS DAGANGAN BERHAD
2	*Kerja-kerja perkhidmatan penyelenggaraan sistem kebakaran pemadam api automatik dan mudah alih serta perkakasan yang berkaitan di Pencawang Masuk Utama, Grid Maintenance Selatan, Bahagian Grid, Tenaga Nasional Berhad, untuk tempoh 2 tahun.*	RM 600,000.00	2021	2023	2 Years	STESEN JANAELEKTRIK TNB SULTAN ISKANDAR, PASIR GUDANG, JOHOR.
3	Project dismantle and reinstall racking at *Kilang Cat* Smart Paint Sdn Bhd Desa Cemerlang.	RM60,000.00	29/11/2021	27/012022	2 Months	*Kilang Cat* Smart Paint Sdn Bhd Desa Cemerlang.

CHAPTER 3

CASE STUDY

3.1 Introduction to Case Study

A fire protection system is carrying the meaning of detecting, informing, or evacuating a public access building in the event of fire. It is also can reduce the risk of life since they are functioning as first aid that every people can use them when they are in the unfortunate situation. Thus, at least one type of fire safety system needs to be installed or obtainable in any types of building. However, installing any type of fire safety system in a facility is determined by the Safety Committee or based on the facility's Safety Regulations. Therefore, this study describes some of the types of fire protection system that are used at Pasir Gudang Energy or can be called as Stesen Janaelektrik TNB Sultan Iskandar which located at Jalan Pekeliling, 81700 Pasir Gudang, Johor.

Figure 3.1 : the location of the site visit

(https://www.google.com/maps/search/tnb+sultan+iskandar/@1.4490046,103.8805801,998m/data=!3m1!1e3)

3.2 To Identify the Types of Fire Protection Installed at TNB Pasir Gudang

3.2.1 Fire Control Room

The purpose of installing fire alarm control panel is to activate a quick emergency response when there's a fire. No matter the types of the method of detection is, if the alarm is triggered, sounders will operate to warn people in the building. Thus, it helps everyone in the building to have a chance to save themselves by going out from the building. This control panel also have a variety type and also its features, which every type of panel has a different capability for its function. For example, a basic fire panel might sound an alarm to alert every one of the dangers. Some fire panels also can be functioned in alarming the fire department, and the other is to activate the building's sprinkler system.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

By law-238 - Every large premises or building exceeding 30.5 meters in height shall be provided with a command-and-control center located on the designated floor and shall contain a panel to monitor the public address, fire brigade communication, sprinkler, water flow detectors, fire detection and alarm systems and with a direct telephone connection to the appropriate fire station by passing the switchboard (Lee, 2016)

3.2.2 Main Fire Alarm Control Panel

Figure 3.2: Main fire alarm control panel

The fire alarm is located strategically so it can be reached easily. The main fire alarm control panel which relays fire detection and initiates response and communication between detectors, alarms, suppression systems and another firefighting system that found in fire control room.

3.2.3 Fire Alarm System

In order to protect lives, fire alarm system was designed to alert human about the emergency so that people can take a quick action before the flames starting to flare. Almost every ceiling of the rooms of the building located in TNB Pasir Gudang have been installed at least one of the three types of fire alarm system. The types of the fire alarm that were supply by the company is heat detector, smoke detector and manual call point. Despite the detection method is different, if the alarm is triggered, sounders will operate to warn people in the building that they might facing a risk that cost a life and also alert them to leave the building as soon as possible.

Based on what have been investigate, the "Brain" of the fire detector system is the Fire Alarm Control Panel. It acts as central hubs for all of the detector signals to be linked to and gives users a status indicator. Other than that, the unit is also can be set up to simulate an alarm to use it in routine fire and evacuation drills. Thus, this activity can ensure that all employees are aware of what to do in the real incident. There is a wide array of different types of fire alarm detectors such as heat detectors, smoke detectors, carbon monoxide detectors, multi-sensor detectors and manual call points. However, the company are only supplies some of them as stated before.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

by-law 225

(1) Every building shall be provided with means of detecting and extinguishing fire with fire alarms together with illuminated exit signs in accordance with the requirements as specified in the Tenth Schedule to these By-laws.

By-law 244

All firefighting installations and appliances shall conform to the current edition of the following standards:

(g) Fire Alarm Systems

3.2.4 Heat Detectors

Figure 3.3: Heat detector

Firstly, it is a heat detector. Heat detectors is being installed to detect fires. This type of detector can either work on a fixed temperature basis, which the detector will trigger an alarm if the temperature exceeds a pre-set value, or they can actually work on the rate of change in temperature. Other than it is not as prone to false alarm, it also less expensive than smoke detectors.

3.2.5 Smoke Detectors

Figure 3.4: Smoke detector.

Next, the type of detectors that can be found at TNB Pasir Gudang is smoke detector. This item is a device that detects smoke, and typically used as an indicator of fire. It also serves to activate fire systems when a certain amount of smoke is detected. Basically, there are three types of them which is ionization, light scattering and lastly is light obscuring. However, the only type of smoke detector installed at TNB Pasir Gudang is light obscuring smoke detector. This type of fire detection item can be used to protect such a large area as the light source and the photocell is positioned at some distance apart.

3.2.6 Manual Call Points

Figure 3.5: Manual call point/break glass.

Last but not least, the type of fire detector that was installed is manual called point or can be called as break glass call point. It was designed for fire detection system with a central control monitor. It can be used either for open or closed circuits. This is because when the surface's glass is pressed hard or broke, the circuits will cut off instantly.

3.2.7 Fire Fighting System

Regardless a type of building, it should be constructed by following the agreement of the building code. Therefore, a firefighting system is one of the most important parts of all building services due to its establishment in order to protect human life and property. Firefighting tactics, equipment, and procedures are used to put out flames and reduce the damage they cause. And those are including a big tank, pumping systems, a network of pipelines, and hydrants or sprinklers.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

by-law 245

(1) All firefighting installations and appliances other than those conforming to the standards listed in by-law 244 shall be of those as tested and approved by the D.G.F.S

3.2.8 Fire Extinguisher

Figure 3.6: Portable fire extinguisher.

The portable fire extinguisher as shown in **figure 3.6** is one of the extinguishers that are supplied at TNB Pasir Gudang. There are two types of fire extinguisher that are installed there which is ABC Dry Powder and Carbon Dioxide. The total of extinguishers the company supply is 153 units includes both of the types mentioned.

Portable fire extinguisher is one of the most items used or obtainable everywhere. This is because it functioning as first aid for firefighter especially during the initial and small fire outbreak. There are two main types of fire extinguishers which are stored pressure and cartridge operated. For stored pressure units, the expellant is stored in the same chamber as the firefighting agent itself and it also is the most common type of fire extinguisher. However, different propellants are used depending on the agent used. While nitrogen is used for dry chemical extinguisher, air is normally used for water and foam extinguishers. Apart from that, cartridge operated extinguishers contained the expellant gas in a separate cartridge that is ruptured first before discharge, in order to expose the propellant to the extinguishing agent. This type of fire extinguisher is not that common because it usually used primarily in areas like industrial facilities, where they receive higher than average use. Thus, for TNB Pasir Gudang, the company supplied the cartridge operated extinguishers as they are necessity for high-risk environments.

Fire extinguishers can also divide into four different classes which are class A, class B, class C, and class D. Every class can put out a different type of fire. For example, Class A will extinguish the flames that in common combustibles such as wood and paper. Next, extinguishers that classified as Class B are used for liquids' flammable. To be exemplified, the flames are based on grease, gasoline, or oil. Other than that, Class C extinguishers are suitable only for electrically energized fires. Lastly, for extinguishers that are in Class D is designed for a metal based of fire. However, multipurpose extinguishers can be used on different types of flames, and it also labeled with more than one class. For example, one of the fire extinguishers that is supply by the company is ABC dry powder. Therefore, these units can be used for wood, trash, flammable liquids and also energized electrical equipment.

However, the installation and requirement of the portable fire extinguisher that are stated before, must complying with UBBL, MS1595 or any other standard that are approved by the fire authority.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

by-law 227

Portable extinguisher shall be provided in accordance with relevant codes of practice and shall be sited in prominent position on exit routes to be visible from all directions and similar extinguishers in a building shall be the same method of operation.

M.S 1539 – Specification for portable fire extinguisher: Part 3: Selection and Application – Code of Practice

3.2.9 Hose Reel

Figure 3.7: Hose reel

Hose reel is considered as the first aid to firefighting, and it also designed to be used as a quick-response method of building occupants to fight the flames in early stages. Based on the literature reading, fire hose reels should be located in recesses along corridors to provide a reasonably accessible. Other than that, it also can control the supply of water to combat a potential fire risk. They are such an ideal for a large high-risk environment where the hose reels can come in lengths of 30m of 19mm and 25mm hose. Besides, it also manufactured in variety such as its available in fixed, swinging, recessed and concealed versions with automatic or manual valves. Hose reels can be used when the 9litres extinguisher does not provide an adequate cover for the large areas or corridors. In any case, the hose reel is also needed if the area floor of the building is exceeding 5000m^2**.** Thus, the area can be covered by one installation. This calculation should be including that the nozzle needs to reach within 6m of the furthest part of the building.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

by-law 231

(1) wet rising system shall be provided in every building in which the topmost floor is more than 30.5 meters above fire appliance access level.

(2) A hose connection shall be provided in each firefighting access lobby.

3.2.10 External Fire Hydrant

Figure 3.8: External fire hydrant

Fire Hydrant Protection System is designed to fight fire of huge proportions, in all classes of risks. It is designed to be in operation even if a part of the affected structure collapses. Fire hydrants is to supply the water supply as required by the Fire and Rescue Department of Malaysia for extinguishing during the firefighting operations. The installation consists of a system of pipe work that connected directly to the main water supply in order providing water to each and every hydrant outlet. It also intended to provide water for the firemen to fight the fire. other than that, it also should be located in every certain distance in order allowing a quick access while putting out the flames. Next, as suggested it need to include a maximum spacing of 150 meters between buildings close the roadways, a maximum distance of 70 meters from the building entrance and a minimum distance of 6 meters from the building.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

by-law 244

All firefighting installations and appliances shall conform to the current edition of the following standards:

(a) Fire Hydrants

3.2.11 Pump System

i. Jockey Pump

Figure 3.9: Jockey pump

One of the water pump systems found at TNB Pasir Gudang is Jockey pump. Jockey pump is a small pump that connected to a fire sprinkler system to maintain pressure in the sprinkler pipes. It is to make sure that if a fire-sprinkler is activated, there will be a pressure drop. Thus, it will be sensed by the fire pumps automatic controller which it will cause the fire pump to start. It also such an important system of the fire pumps control system.

UBBL 1984

Part VIII: Fire Alarms, Fire Detection, Fire Extinguishment and Fire Fighting Access.

By law-253

(2) Emergency power systems shall provide power for smoke control systems, illumination, fire alarm systems, fire pumps, public address systems, fire lifts and other emergency systems.

3.3 To Investigate the Operation of Fire Protection System in The Building

3.3.1 Fire Control Panel

Fire control panel only can respond to the signals that they received from the systems that detect the smoke which they cannot simply detect the fire on its own. So, basically the control panel will receive the signals either from smoke detectors, the fire sprinkler system, a manual call point or a pull switch in the building. While the panel's response is activated, which might include a loud noise and lighting up to warn people of the fire, then it might also send a signal to the fire department to get the emergency crews to rush to the incident's area.

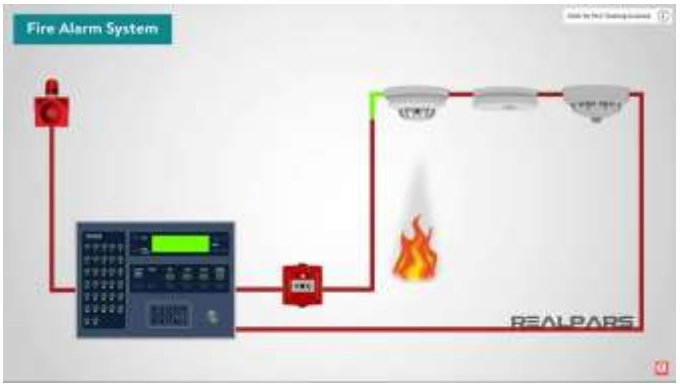

Figure 3.10: the smoke of the flames getting detected by the smoke detector.

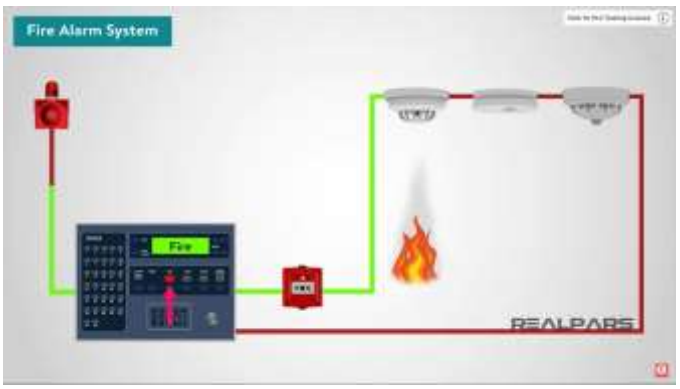

Figure 3.11: the control panel receives a signal from smoke detector and manual call point

Figure 3.12: the loud noise and the emergency light is activated to warn the personnel and need them to leave the building.

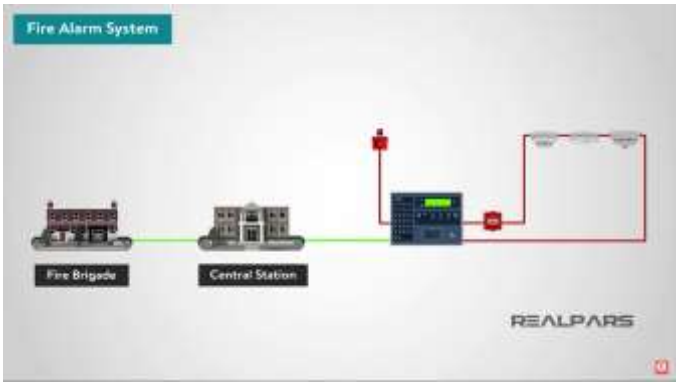

Figure 3.13: that the panel sends a signal to the fire brigade through the central station.

3.3.2 Fire Alarm System

i. Heat Detector

Even though the heat detector is such a common device, their functions are limited as the response of heat detectors might not be adequate in many instances. Heat detectors are also known as slower respondent as they cannot respond to smoke. Thus, it is typically best suited for detecting fast-growing fires in small spaces. Heat detectors are also a means of fire detection in locations that smoke detectors cannot protect because of environmental effects as mist that usually occurring smoke and high humidity.

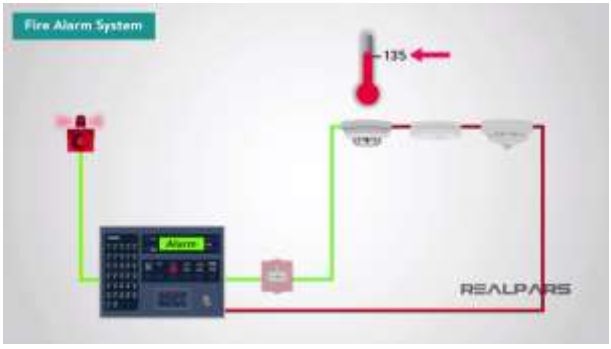

Figure 3.14: The visual of how heat detector works
(https://realpars.com/wp-content/uploads/2019/07/Heat-Detectors.png#.Ya2WsklRA4M.link)

Besides, heat detectors can work in a similar way to an electrical fuse, the detectors contain a eutectic alloy where when the heat at a certain temperature is reached the alloy it will turns from solid to a liquid and it will trigger the alarm.

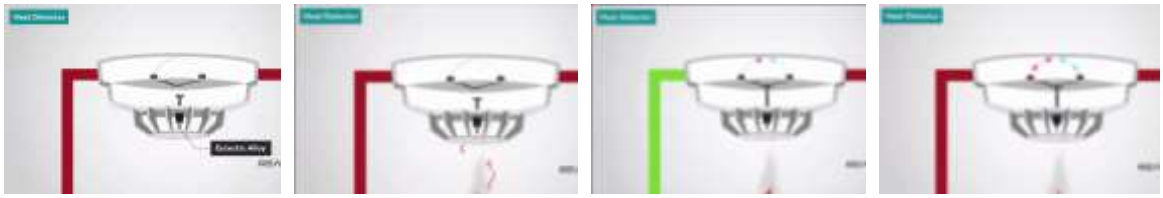

Figure 3.15: The visual of how heat detector works
(https://realpars.com/wp-content/uploads/2019/07/Heat-Detectors-Mechanism.gif#.Ya2WsuxCcRU.link)

ii. Smoke Detector

As stated before, at certain places in TNB Pasir Gudang was installed a smoke detector which are known as photoelectric smoke detector. This type of detector is operated by light obscuring. The process of this detector is when smoke interferes with the light beam among the light source and the photocell, the photocell will measure the amount of the light it receives. By the variation in the photocell output, it is being used to initiate the alarm.

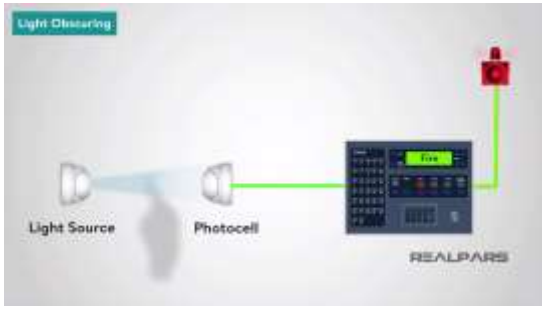

Figure 3.16: the visual animation of the smoke detector sending the signal
(https://realpars.com/wp-content/uploads/2019/07/Light-Obscuring-Smoke-Detector.png#.Ya2WslD3R8s.link)

iii. Manual Call Point

The alarm is operated manually where the device is needed personnel to trigger the alarm by breaking the frangible element on the fascia. Then, the alarm will then be starting to warn as soon the glass is broken.

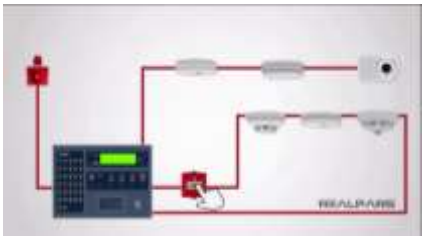

Figure 3.17: personnel breaking the break glass

Figure 3.18: the alarm will be making a noise and sends a signal to the control panel

(https://realpars.com/wp-content/uploads/2019/07/Manual-Call-Points.gif#.Ya2WsihFlUU.link)

3.3.3 Fire Extinguisher

Figure 3.19: The guide to use fire extinguisher.

(Tajuddin, 2019)

Portable fire extinguisher is operated manually at the initial of fire outbreak, but it is only for a small fire to settle down. As shown in the figure above, there are four basic steps to operate the fire extinguisher which are:

P – Pull the pin

Locking pin that are located under the trigger need to be pulled before using the fire extinguisher. Then, the extinguisher needs to be tested to ensure they are well functioned by holding and pointing away.

A – Aim low

The fire extinguisher nozzle should be aimed at the base of the fire which is the lowest point of the fire and not on the flame or smoke.

S – Squeeze the trigger

To release and expel the extinguishing agent through the nozzle, the handle or the trigger have to squeeze slowly and evenly to operate and discharge.

S – Sweep side to side

Fire extinguishers need to sweep side to side at the base of the fire till it is completely out and settle down. If the fire re-ignites, repeat the process.

3.3.4 Fire Fighting System

i. Hose Reel

Figure 3.20: P.O.R.T.S rule's to use the hose reel system

(BSE, 2019)

Hose reel system is manually operated and activated by opening a valve that allowing the water to flow into the hose. The system pressure loss will activate the pump to ensure an adequate water flow. So, the pressure can provide a water jet that typically in minimum range of 10 meter from the nozzle. As shown from the **figure xxx**, it has stated a simple method for the occupant to remember how to use the fire hose reel properly. The **P.O.R.T.S** rule is basically a short form of the order on how to use the hose reel.

P **-** Pull and swing out the hose reel drum.

O **-** Open the control valve.

R **-** Roll out the hose.

T **-** Turn 'ON' the nozzle valve.

S **-** Spray water over the fire.

ii. **Fire Hydrant**

Figure 3.21: a guide to use the hydrant

(Staff, n.d.)

During the fire, firemen or any experienced people have to open the hydrant box to take the hose and nozzle out. After that the hose should be connected with the nozzle to linked them to the hydrant. Then, manually open the hydrant valve so that, the water will flow out from the nozzle. As the water flow out, aim the nozzle at the base of fire then pull the nozzle handle and direct the stream to the fire. However, if they are not standing in the proper position while holding the hose, the volume of the pressure and the speed of the stream might knock them over. Thus, it is important to be in the right position as practices.

iii. Jockey Pump

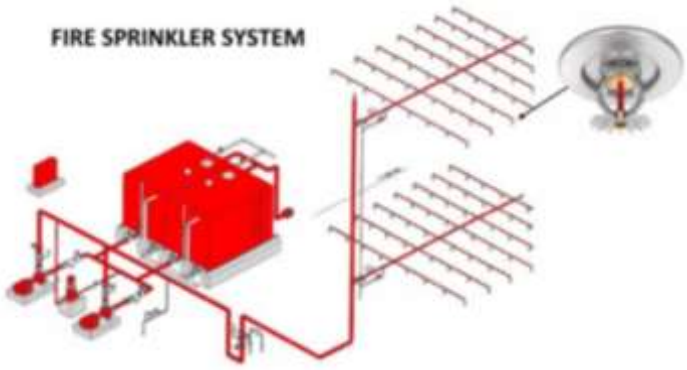

Figure 3.22: diagram of fire sprinkler system

In order to understand how this system works, it is important to understand how a fire sprinkler system works. This is because they are both related to each other. Sprinkler system consist of pipes with pressurized water in them and heads that are designed to open when they reached a certain temperature. When the head of the sprinkler opened, the water pressure will drop since the water is flowing out from them. When this occurs, a massive device known as a jockey pump begins to deliver additional water down the pipes, allowing the system to continue to extinguish the flame.

The purpose of the jockey pump is to keep the water pressure in the pipe within a specific range of volume when there's no fire. This is to prevent the sprinklers go off randomly. Other than that, the jockey pump will also sense if the pressure inside them goes down since the pipes leak. So, the pump will fill them back up to the normal pressure. However, if a fire happens and the pressure drops in dramatically, the jockey pump will not be able to keep up that cause the pressure dropped will trigger the large fire pump and start sending water. Last but not least, the pump is also preventing the sprinkler systems from being damaged when the fire pump begins sending water. The system might have relatively low pressure if they do not have a jockey pump to keep them pressurized. This is because when the fire pump starts sending such a high pressurized water through the pipes, the change in pressure can damage or destroy the system. Thus, jockey pump is one of the large devices that are important in fire pump system.

3.4 To determine the inspection and test of fire protection system

3.4.1 Fire Control Panel

Figure 3.23: inspection and test of Main Fire Alarm Panel

Fire alarm systems provide an early fire detection and notify building occupants to evacuate. These control panel may be functioned to trigger special protection systems in the event of a fire. So, the main fire alarm control panel should be inspected and need to do a maintenance if there are a faulty founded. This is to ensure the systems are in a good condition and all bulbs also need to be tested weekly so it will be functioning well when the incidents happen.

There some of level in doing the inspection and test by its component. For example:

i. Weekly

A weekly inspection and test, the contractors need to operate engine-driven generators for 30 minutes. This activity is to verify the generator is running smoothly, and also to ensure the coolant temperature and lubrication pressure are within normal range.

ii. Quarterly

For a quarterly inspection, they need to check the representative number of notification appliances and also need to check open the circuit voltage of nickel cadmium batteries.

iii. Semiannual

The semiannual inspection and test process is; they have to verify the manual pull stations are capable of sending alarms. Next, they need to check one or more devices on each circuit of all restorable and non-restorable heat detectors which fixed temperature and spot-type detectors are excluded. Other than that, to ensure that signal devices can give an appropriate signal upon the activation and require to check open the circuit voltage and specific gravity to lead acid batteries.

iv. Annual

Checking the voltage of storage batteries under full-load conditions is an annual inspection and test. This is to replace the expired batteries. Also, it is including a verification of control panel lights and fuses are working in well conditions.

3.4.2 Fire Alarm System

Figure 3.24: inspection and maintenance of Fire Alarm Systems.

Fire alarm systems required to be inspected by a competent person weekly to ensure that:

a) The detectors are not obstructed or painted over. This is to ensure that they are well functioned.
b) No obstruction is placed within 0.3 meter (1 foot) horizontally or 0.6 meter (2 feet) below a detector head.
c) The detectors are protected against mechanical impact damage.

In order to make sure that they are working properly, selected heat and smoke detectors must be tested every month. Then, all the records must be jotted down after carried out all the tests and inspections, any faults discovered, and details of all replacement fitted also included.

3.4.3 Fire Extinguisher

Figure 3.25: fire extinguisher.

A weekly inspection for fire extinguishers is basically just a visual inspection. This is because the only task that the worker needs to do is to ensure that the fire extinguisher is in a good physical condition, is visible and accessible. Other than that, they also need to confirm that the extinguisher has been inspected within the last year and is properly tagged. Instead of ensuring that the lock pin and seal are in their place, they also need to check the pressure on gauge to verify if they are in a good condition or not. For the annual inspection, they might need to recharge if the weigh is lighter than usual. Other than that, if the bottle is being used over 10 years or more, they need to be disposed. Last but not least, the certificates sticked on the bottle need to be renew if they are already expired.

3.4.4 Hose Reel

Figure 3.26: testing the hose reel

Fire hose reels require a regular visual examination on the hose and all the fittings to ensure no defects or leaks. Next, the low rate of the water delivered by the hose should be tested with a flow meter. So, it can verify that the water delivered at the required rate. If the hose is worn or any parts that are found faulty, the workers need to repair them so it can be used properly when it needed. At the end of the service, all the items need to be cleaned as the person in charge need to leave the site cleaned and tidier.

3.4.5 Fire Hydrant

Figure 3.27: fire hydrant

i. Weekly

For a weekly inspection and test, the person in charge need to check for general conditions which are the hydrant accessibility, and for hose, nozzles and all the related equipment they need to be stored dry in the hose box.

ii. Monthly

Nozzle, cap threads and gasket need to be examined every month and should be lubricate or replace them if they are founded in faulty condition. Other than that, dry barrel type of hydrants also needs to be checked out for a proper drainage. The steps are including, remove the cap from the discharge outlets, and inspect the drainage.

iii. Annual

Each hydrant needs to be opened and flushed by removing its caps and opening the valves. While doing these steps, the stream of water should be verified they will not cause and damage. after that, valve will be shut and the barrel should be emptied, drain is cleared and any leaks that was founded need to be repaired. Besides of focusing to the leaking part, threaded fittings also need to be lubricated especially stem nut.

However, performing a hydrant flow test might be a risk of injury to personnel and could give a property damage, thus, in order to minimize the likelihood of injury or damage, the testing should only be performed under controlled conditions by qualified persons knowledgeable of the potential hazards.

3.4.6 Jockey Pump

Figure 3.28: jockey pump system

i. Weekly

The first items that need to be inspect weekly is valves and piping system. The personnel need to check the pump suction, discharge, and bypass valves in order to make sure they are open, and the piping is free from any leaks. Next is the controller. The controller should be inspection if the energy power is available and need to do a reverse phase alarm to make sure they are not activated. Other than that, suction tank must be remained full.

Weekly test procedure:

1. Start the pump automatically by pressure drop and the starting pressure should be recorded. Observe any abnormalities such as the time needed of the motor to accelerate to full speed.
2. Run for at least 10 minutes, the process needs to be checked and recorded. For example, the suction and outlet pressure, for unusual noise or vibration or if the pump casing, bearings or boxes are needed for the overheating.

In order to do an inspection or maintenance of the fire pump, the personnel should take a note as the interior of the fire pump controller cabinet is containing such a high voltage part that might pose a risk of injury, a damage and worse is death. Thus, to minimize the electric shock or property damage, maintenance and testing need to be performed by under controlled conditions by qualified persons that are knowledgeable of the potential hazards.

CHAPTER 4

CONCLUSION

In a nutshell, there are many things that I have learnt and undergone during my twenty weeks of industrial training at EME Resouce Sdn. Bhd. The whole training period was very interesting, productive, instructive, and challenging. Through this training, student gains new insights and more comprehensive about the real industry working condition and practice.

The practical training experiences in this company also gave me a good experience of working in development of fire protection system maintenance and gain more understanding of the work culture in dealing with the sub-contractor and clients. This practical training helps me as student to improve communication skill, work under pressure and be creative thinker to solve the problem either on site or in preparing documents. From my opinion, I am agreed that this internship program had achieved its primary objective and very helpful to help student understand the real situation when involving with construction field. Besides, it is also such a top way to prepare student facing a real working life and can prepare them to learn the cycle for future.

Once again, I would like to thank to all involved especially to Encik Kamarul and Encik Karim as my manager during my internship, Puan Noor Fazirah Ali and Encik Ahmad Amirul Alif as my supervisor and to all EME Resouce Sdn. Bhd staff for their good cooperation and also my coordinator for this subject Ts. Wan Akmal Zahri Wan Zaharuddin for the guidance and advice for me to complete industrial training

REFERENCES

(n.d.). Retrieved from https://realpars.com/wp-content/uploads/2019/07/Heat-Detectors.png#.Ya2WsklRA4M.link

(n.d.). Retrieved from https://realpars.com/wp-content/uploads/2019/07/Heat-Detectors-Mechanism.gif#.Ya2WsuxCcRU.link

(n.d.). Retrieved from https://realpars.com/wp-content/uploads/2019/07/Light-Obscuring-Smoke-Detector.png#.Ya2WslD3R8s.link

(n.d.). Retrieved from https://realpars.com/wp-content/uploads/2019/07/Manual-Call-Points.gif#.Ya2WsihFlUU.link

BSE. (2019, September 07). Retrieved from The Hose reel System - your Second Lifeline in Your Hands: https://www.bse.com.sg/post/the-hose-reel-system-your-second-lifeline-in-your-hands

Lee, J. (2016, June 10). Retrieved from UBBL1984: https://www.slideshare.net/JoshuaLee68/ubbl-1984-pdf

Staff, E. (n.d.). Retrieved from Fire and Safety: https://instrumentationtools.com/fire-and-safety/

Tajuddin, A. (2019, August 06). Retrieved from How to use Fire Extinguisher: https://www.safetynotes.net/how-to-use-fire-extinguisher/

APPENDICES

SURUHANJAYA SYARIKAT MALAYSIA
COMPANIES COMMISSION OF MALAYSIA

CERTIFIED TRUE COPY

PERAKUAN PEMERBADANAN SYARIKAT SENDIRIAN

EME RESOURCES SDN. BHD.

MOHD NAIM DARUWISH
PENDAFTAR SYARIKAT
MALAYSIA

Appendix 1: SSM certificate

CIDB
MALAYSIA

PERAKUAN PENDAFTARAN

STATUS: AKTIF

Appendix 2: CIDB registration


TENAGA NASIONAL

Dengan ini disahkan bahawa

EME RESOURCES SDN. BHD.

NO. 72A, TINGKAT 1,
JALAN PADI SATU,
BANDAR BARU UDA,
81200,JOHOR BAHRU,JOHOR

Telah berdaftar dengan Tenaga Nasional Berhad sebagai
Kontraktor Kerja
di bawah kategori yang tercatat dalam sijil ini

GRED	KATEGORI	PENGKHUSUSAN
G3	B	BM****
	CE	CE21****
	ME	M02****

BUTIR-BUTIR PENDAFTARAN

NO PENDAFTARAN TNB	:	[illegible]
NO PENDAFTARAN SYARIKAT	:	[illegible]
NO SIJIL PENDAFTARAN	:	[illegible]
TEMPOH SAHLAKU SEHINGGA	:	[illegible]
TARAF BUMIPUTERA	:	BUMIPUTERA
LAIN-LAIN PENDAFTARAN	:	

Tarikh kelulusan : 23.11.2015

Appendix 3: TNB vendor registration certificate (CIDB)


TENAGA NASIONAL

Dengan ini disahkan bahawa

EME RESOURCES SDN. BHD.
NO. 42, JALAN KEMPAS INDAH 1/1
TAMAN KEMPAS INDAH
81300 , JOHOR BAHRU , JOHOR

Telah berdaftar dengan Tenaga Nasional Berhad sebagai
Pembekal & Kontraktor Perkhidmatan
di bawah kategori yang tercatat dalam sijil ini

BUTIR-BUTIR PENDAFTARAN

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NO PENDAFTARAN SYARIKAT	:	[illegible]
NO SIJIL KEMENTERIAN KEWANGAN	:	[illegible]
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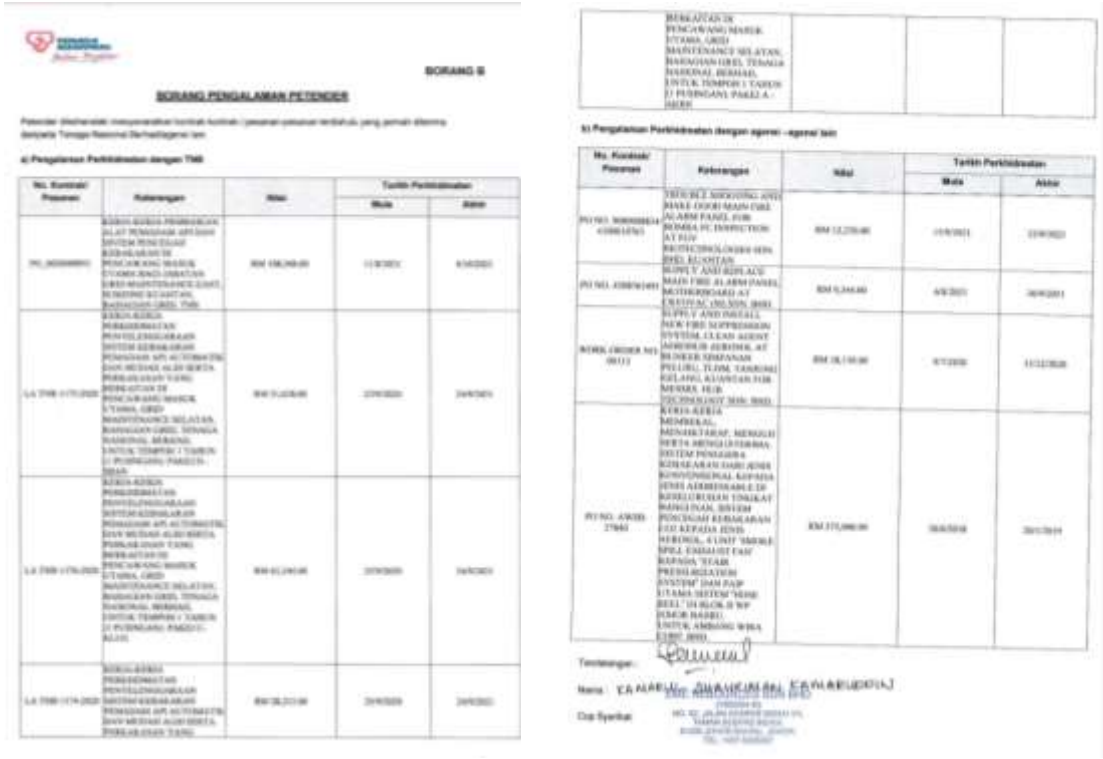
Tarikh kelulusan : 04.06.2021

Appendix 4: TNB vendor registration certificate (MOF)



BORANG B

BORANG PENGALAMAN PETENDER

a) Pengalaman Perkhidmatan dengan TNB

No. Kontrak/ Pesanan	Keterangan	Nilai	Tarikh Perkhidmatan	
			Mula	Akhir

b) Pengalaman Perkhidmatan dengan agensi –agensi lain

No. Kontrak/ Pesanan	Keterangan	Nilai	Tarikh Perkhidmatan	
			Mula	Akhir

Tandatangan :

Nama :

Cop Syarikat :

Appendix 5: list of projects