

**CENTRE OF STUDIES FOR BUILDING SURVEYING  
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING  
UNIVERSITI TEKNOLOGI MARA  
SERI ISKANDAR CAMPUS**

**BACHELOR OF BUILDING SURVEYING  
(AP229)**

**MAINTENANCE AND PRACTICAL WORK FOR AIR-  
CONDITIONING SYSTEM AT IXORA HOTEL**

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**PRACTICAL TRAINING REPORT**

**OCTOBER 2021 - JANUARY 2022**

CENTRE OF STUDIES FOR BUILDING SURVEYING  
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING  
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MAINTENANCE WORK AND PRACTICE WORK FOR AIRCOND AT IXORA HOTEL

JANUARY 2022

This practical training report is fulfilment of the practical training course.

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## **ACKNOWLEDGEMENT**

In the name of Allah, the Most Gracious and the Most Merciful Alhamdulillah, all praise to Allah for the strength and His blessing in completing this report. First and foremost, I also would like to expand my deepest gratitude to all those who have directly and indirectly guided me in writing this report.

In performing this report, I had to take the help and guideline of some respected persons, who deserve my greatest gratitude. The completion of this report gives me much pleasure. I would like to show my gratitude to my university supervisor, Sr Dr NurAzhfahani Ahmad and also my workplace supervisor Mr Rosli bin Ishak @ Mohamed for giving me a good guideline and experiences for this report throughout numerous consultations.

I would like to express my appreciation to my beloved parents, family members, and others for their encouragement, cooperation, endless loved and full support for the report completion, from the beginning till the end. Also, for my classmates and workmates for support and willingness to share information and spend some time with me. I would like to thank for their continued help and support that assisted me to complete this report.

I would like to extend my heartfelt thanks to all those who helped me in many ways with this report. I am very grateful that I managed to complete this report within the time given by my lecturer. Thank you for those who involved to make this report directly and indirectly.

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## **CHAPTER 1: INTRODUCTION**

### **1.1 INTRODUCTION**

This report is done due to the training programme that has been provide for students in their final year as competing their bachelor degree. It is one of the great way to train and expose students to the realities of working environment. Through this program, students also can applied all the knowledge, skills and techniques that has been learn from the previous semester which can help them in improving company profile and also their capabilities during practical semester.

Practical training is also a requirement in completing all courses taken in order to graduate from university. The students will be allocated with a total of 16 weeks of training period by choosing their own practical place. There are no restriction in choosing their training place such as government or private company as long as that company are performing either building control, facilities management and maintenance, building conservation and heritage, building work and appraisal, development and construction or risk management.

Each student will be supervised by an experience employee that are responsible in taking care and guide student throughout their practical training by supervising their attendance, discipline and performance. This will be recorded in the student evaluation report.

## 1.2 OVERVIEW OF IXORA HOTEL SDN BHD



*Figure 1: Ixora Hotel Sdn Bhd*

*Source: Google Image*

Ixora Hotel Sdn Bhd is a leisure and tourism company that are located in Perai, Pulau Pinang, Malaysia. It is officially opened and launched on December 2011 by Dato Seri Lim Guan Eng. The owner of Ixora Hotel Sdn Bhd is Dato' Ng Swee Chin. The rating of Ixora Hotel Sdn Bhd is a 4 star rating that equipped with 326 rooms, 13 floors, 2 basements and 14 types of rooms. The Ixora Hotel is strategically positioned one block from Megamall Pinang, one of the city's main retail malls. As industry estates are only a few minutes away from the hotel, it is an excellent option for all business needs. The Penang International Airport is only 20 kilometres away and takes about 25 minutes to get by vehicle across the Penang Bridge, alongside with a variety of restaurants and nightlife. They also include a beauty spa, gym, in-room workout, valet parking, and 24-hour concierge service, among other amenities and services. For business travellers, the Ixora Hotel offers a fully furnished business centre and meeting facilities.

The 326 rooms and suites are well-appointed, with one king or two large single beds, a separate bath and shower, an LCD flat screen television with Astro TV channels, a refreshment centre, and complimentary high-speed wireless internet access throughout the hotel. It is also a great location for a motivational conference, meeting, exhibition or wedding. Guests can pick from five conference rooms and function spaces totalling 2,425 square metres for every size event, including our lovely 1,033 square metre Grand Ballroom, which can accommodate up to 1,000 banquet seating. All conference rooms feature excellent audio visual technology as well as fully equipped banquet facilities.



*Figure 2: Ixora Hotel Sdn Bhd Official Logo*

*Source: Google Image*

### 1.2.1 Vision, Mission and Corporate Value

#### Vision

- To have dedicated staff to be the leading hotel in the area.

#### Mission

- To ensure guests experience the extraordinary service with genuine value.

Corporate Value	
Integrity	To live up and conducting business to the highest ethical standards and governance.
Innovation	To delivered great solutions to every guest's needs and continue adopting new technology in maintaining competitiveness.
Professionalism	Provide quality services and facilities with a highly professional manner to the guest.
Teamwork	Valuing the team efforts and contribution of each team members and the important of working together as a team in achieving the mission and vision.

### 1.2.2 Location Plan of Ixora Hotel Sdn Bhd

Table 1: Location Plan

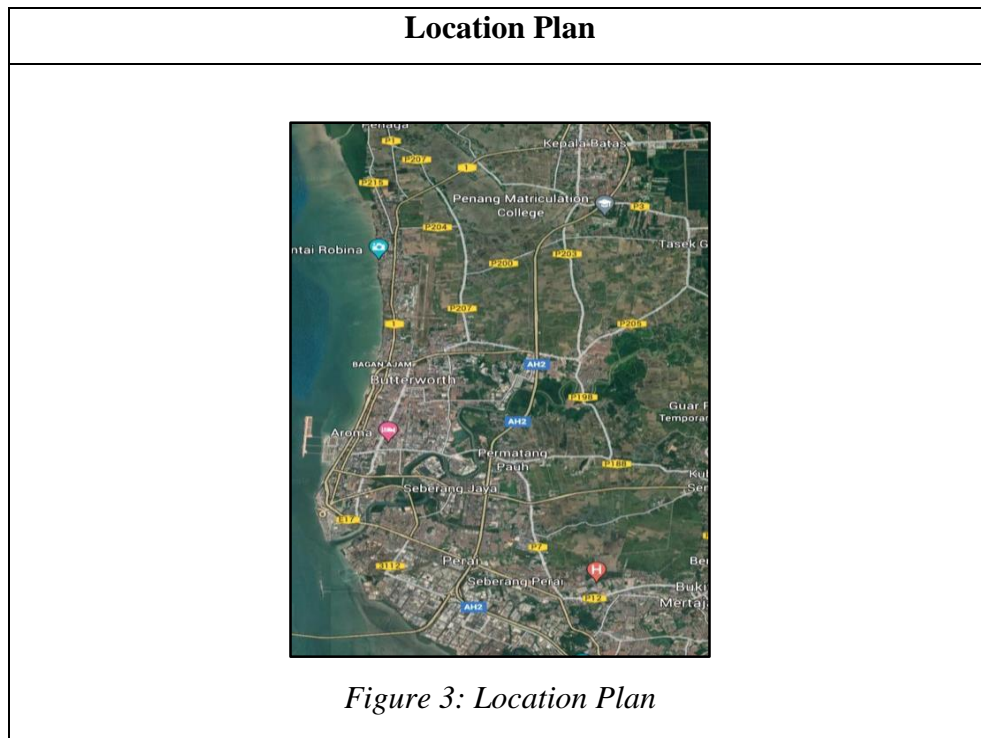


Table 2: Key Plan

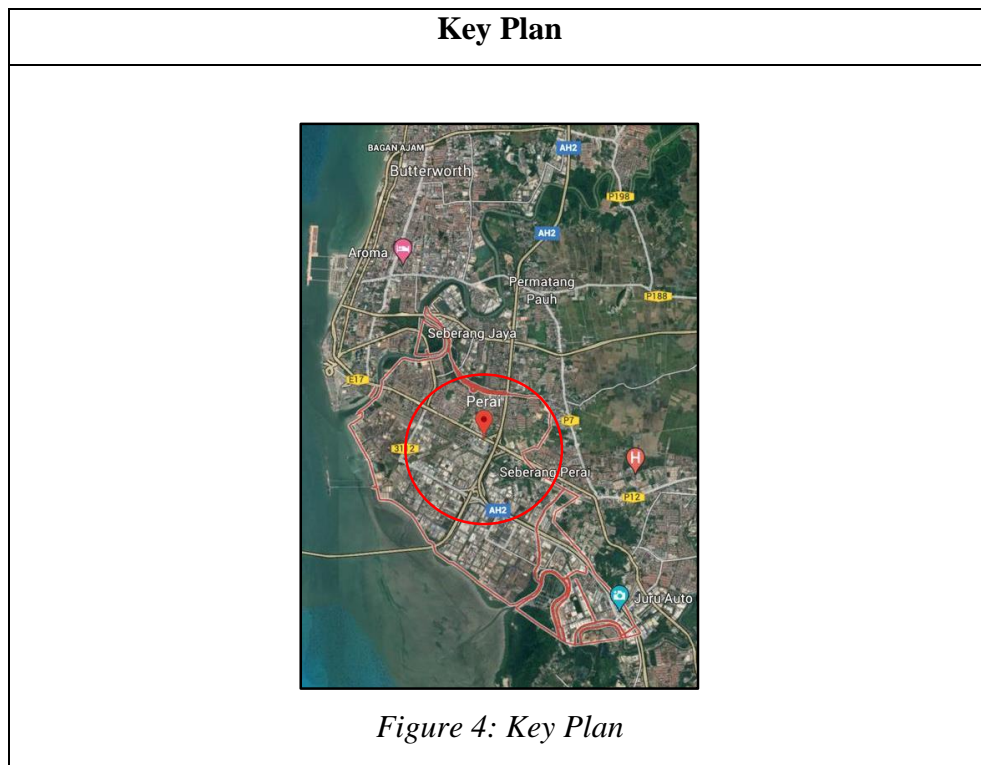
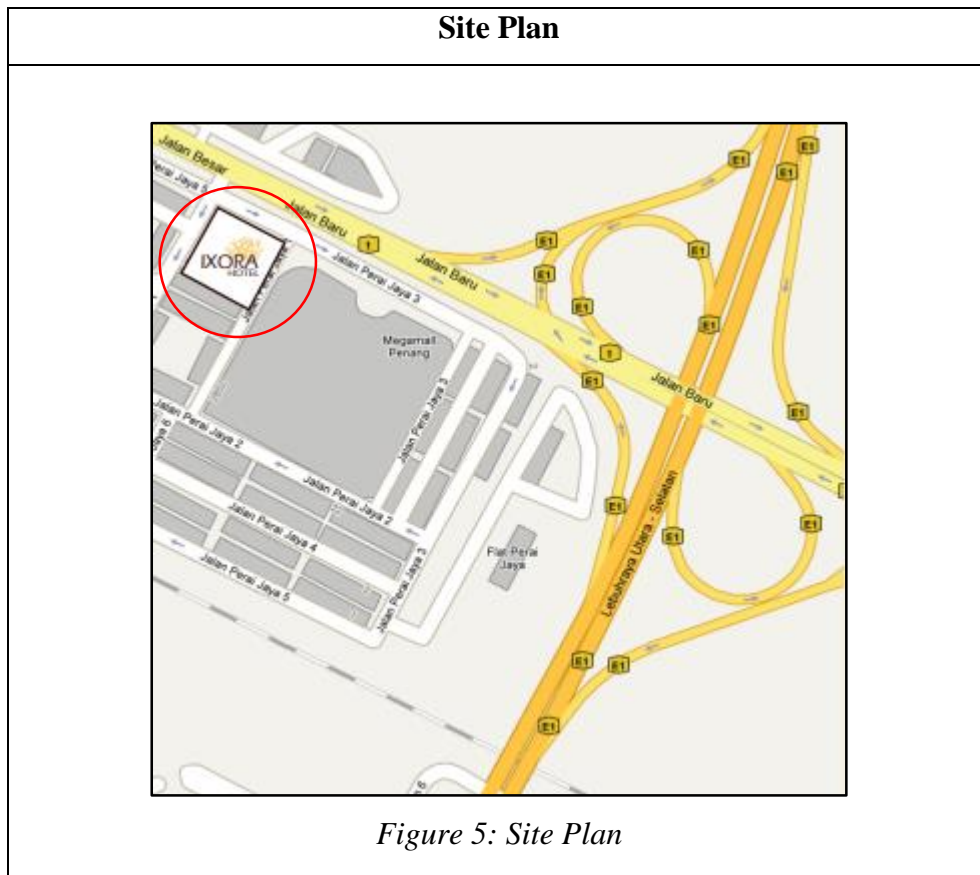


Table 3: Site Plan



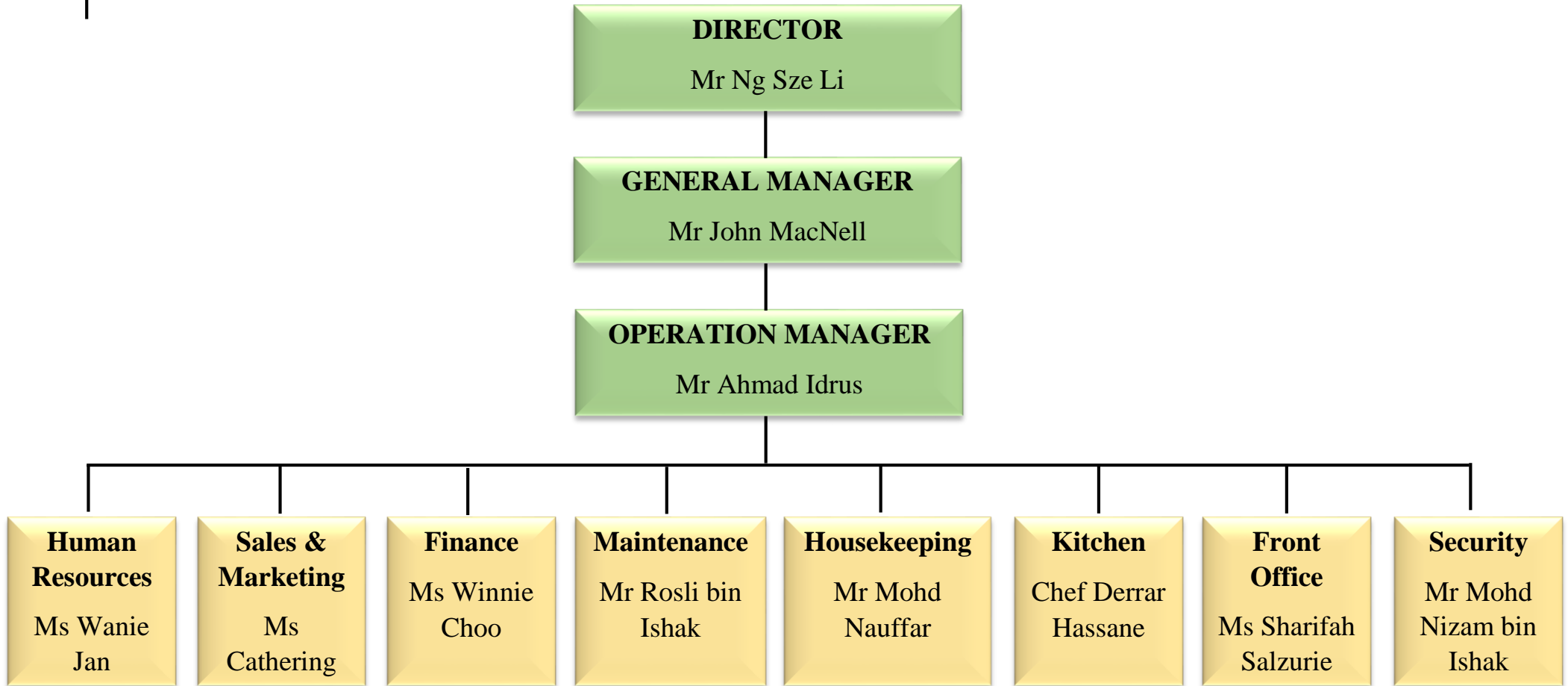
### 1.3 SERVICES AND FACILITIES PROVIDED

Table 4: Services and Facilities

<b>SERVICES AND FACILITIES</b>
○ 24 hour business centre
○ 24 hour concierge service
○ 24 hour in-room dining
○ 24 hour vending machine
○ Self-service check in and check out kiosk
○ Self-service coin laundry
○ Full service laundry and dry cleaning
○ Fitness centre
○ Swimming pool (Adult and kid pool)
○ Children playground
○ Reflexology foot trail
○ Facial and nail service
○ Spa and massage
○ Hair saloon
○ Library lounge
○ Gift shop
○ Currency exchange
○ Limousine and airport transfer
○ Ample undercover parking
○ Free pickup and drop off at KTM Butterworth
○ Free transportation to Sunway Carnival Mall
○ Free laptop on loan

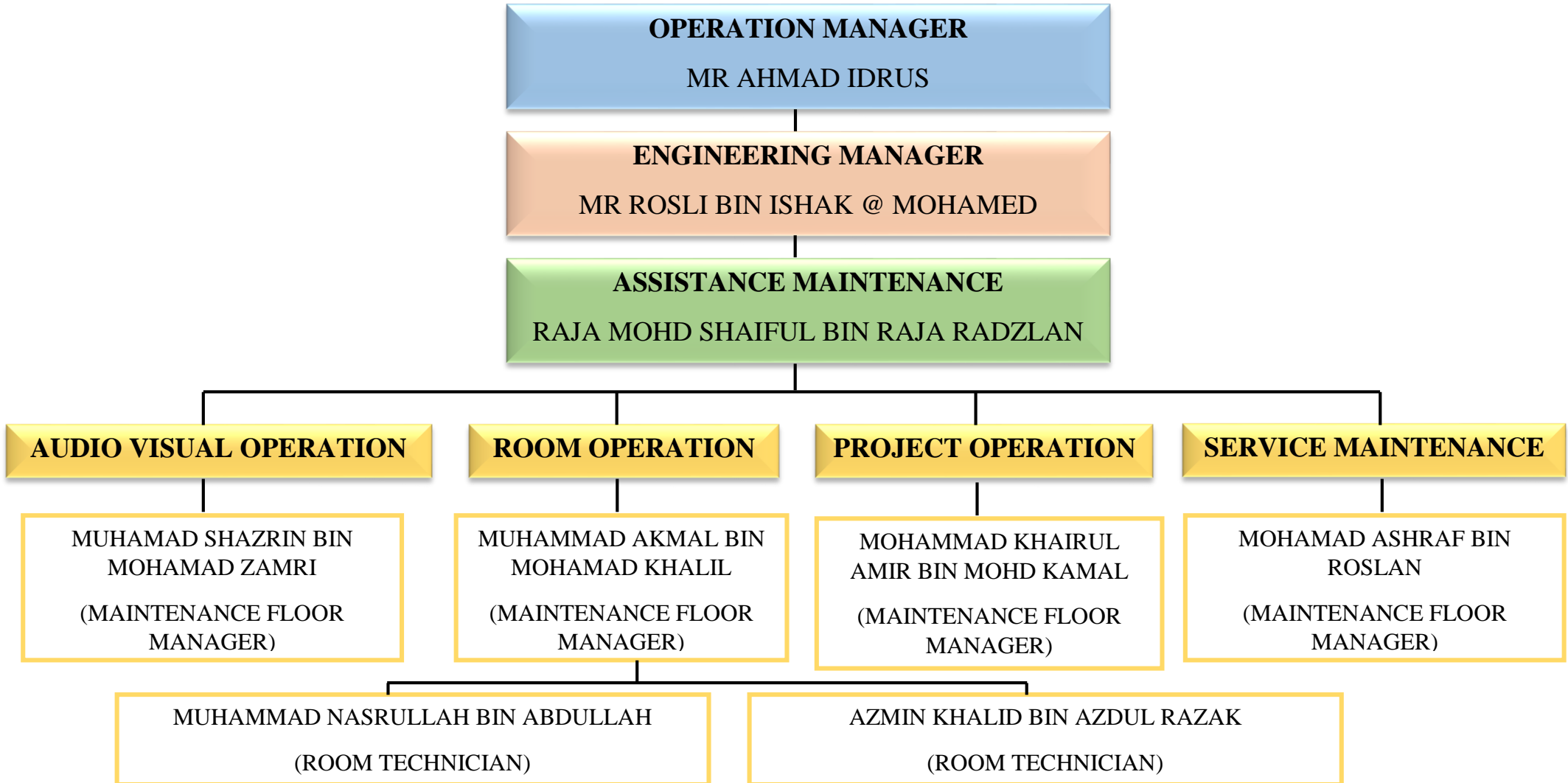
## 1.4 ORGANIZATIONAL CHART

### 1.4.1 Board of Director of Ixora Hotel Sdn Bhd





1.4.2 Organization Chart of Maintenance Department



## **1.5 MAINTENANCE DEPARTMENT OF IXORA HOTEL SDN BHD**

Due to a related subject that I has been interested which is Facilities Management, I was assigned to the Maintenance Department for the duration of my 16-week internship at the Ixora Hotel Sdn Bhd. Mr Ahmad Idrus, the Ixora Hotel's Operation Manager, is in charge of the maintenance department, which includes overseeing and directing all maintenance-related tasks. Mr Rosli bin Ishak @ Mohamed plays another key position as the head of engineering, designing all remedies to problems like as faults or electrical shorts after receiving instructions from the operations manager. All maintenance work will be monitored, and if necessary, corrective maintenance will be performed.

## **1.6 SCOPE OF WORK**

The scope of work in Maintenance Department of Ixora Hotel Sdn Bhd is essentially focuses on the facilities repairing, maintenance, renovation and upgrading the hotel itself. Most of the maintenance work are planned by the Head of Engineering while the work order will be completed by the maintenance staffs, trainee and also contractor.

For the building façade, maintenance department are involved by repainting and plastering any wall especially in guest room that has been affected by the defect. For example, bubbling paint that cause by the high moisture in the wall. Mr Rosli will appointed his staff to do repairing work. For room operation, maintenance department will be involving if there are any complaint from the housekeeping, for example, leaking bidet.

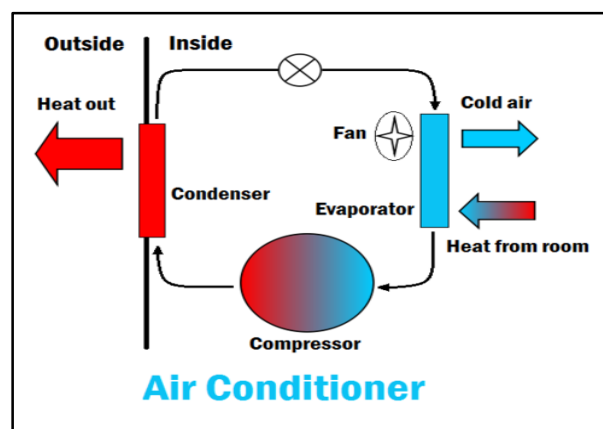
While for audio visual operation, maintenance department will prepared any device that are needed during an event, function or weddings and also being a standby if there are any problems occur. Maintenance department in Ixora Hotel also involved in electrical services. Each trainee will gain various knowledge by following the permanent staffs and can learn something new to them.

## CHAPTER 2: AIR CONDITIONING SYSTEM

### 2.1 DEFINITION AND CONCEPTS

The air conditioning system is the technology that allows us to maintain our chosen temperature in our environment. The system is so widespread that its effects can be felt almost anywhere we go. It can be implemented in our homes, offices, automobiles, and even modern religious centres. In a nutshell, it can be used in both residential and commercial settings. The device not only manages the temperature of a space but also its humidity by cooling the air and forcing it through cold coils, allowing them to regulate the amount of moisture in the air. It has a fan that spreads the conditioned air throughout the room. Buildings and automobiles are common examples of enclosed spaces. While the core idea of air conditioning dates back to ancient Egypt, Willis Carrier created the first modern air conditioning unit in 1902 in response to a problem with air quality at a New York publishing company (What Is Air Conditioning? The Home AC System Explained, 2022).

Human discomfort occurs when the room temperature rises due to heat gain. When the humidity in a space rises to a high level, it becomes difficult to remove body heat. Indoor temperatures of 20°C and relative humidity of 60% are ideal for human comfort (Air Conditioning: Definition, Factors and Types | Mechanical Engineering, 2018). Any air conditioning machine will be able to meet the selected criteria and maintain comfortable conditions. Air conditioners act similarly to a heat pump, but instead follow a cooling cycle. This cooling cycle can be seen in Figure 6.



*Figure 6: Cooling Cycle*  
*Source: Google Image*

Because there is an outdoor element (the condenser) and an indoor unit, air conditioners are referred to as "split-systems" (the evaporator). These two systems operate together to cool as well as remove moisture an indoor space. Warm air from the interior goes over the cool evaporator, where it condenses and loses moisture, similar to how warm air condenses and loses moisture on a cold glass of lemonade. An air conditioner with separate indoor and outdoor components is referred to as a split-system. Another sort of air conditioner, known as a "packaged" system, integrates these components into a single outdoor system.

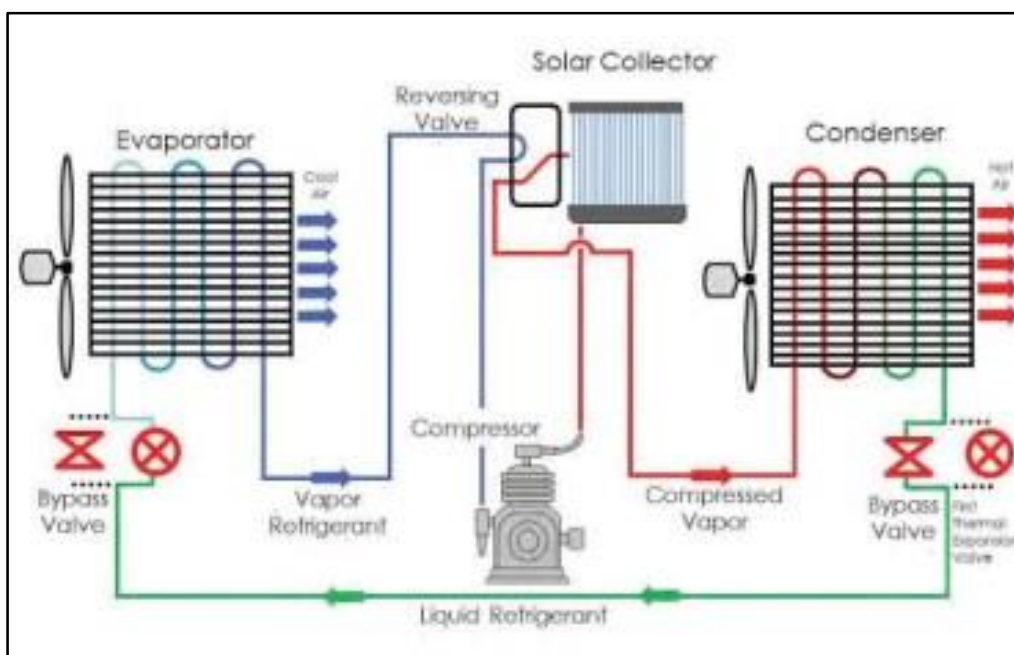


Figure 7: Air Conditioning System (Complete Diagram)

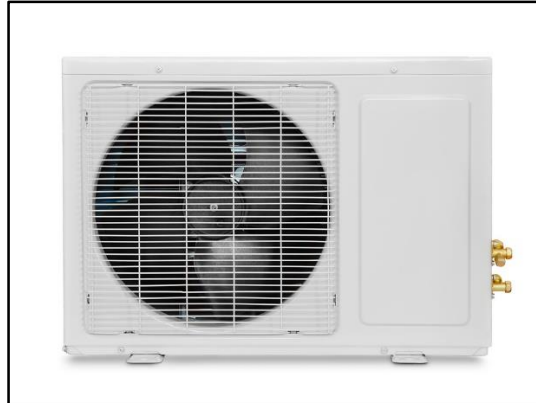
Source: Google Image

## **2.2 FUNCTIONS OF AIR CONDITIONING SYSTEM**

- ✓ The basic goal of air conditioning is to generate a comfortable room atmosphere for people.
- ✓ The temperature of electric gadgets is cooled using a unique sort of conditioning system.
- ✓ It regulates the humidity in a room by allowing 30 to 65 percent humidity while maintaining a temperature of 20 to 26 degrees Celsius.
- ✓ The air conditioning system impacts the room air to keep individuals comfortable while not interfering with their productivity.
- ✓ Temperature, pressure, and humidity are used to describe the state of the air. There is no change in air pressure.
- ✓ Heating, dehumidifying, chilling, and humidifying are all possible uses for an air conditioning system.

## 2.3 COMPONENTS OF AIR CONDITIONING SYSTEM

### 2.3.1 Compressor



*Figure 8: Aircond Compressor*

*Source: Google Image*

The compressor is the system's engine since it operates with a fluid that easily converts gas to liquid. Its main job is to transform low-pressure gas into high-pressure gas with a high temperature. With the help of a created electrified gas, the gap areas between molecules are narrowed. The compressor discharges this electrified gas, also known as a refrigerant, into the condenser.

### 2.3.2 Condenser Coil



*Figure 9: Aircond Condenser Coil*

*Source: Google Image*

A fan cools the high-pressure gas and transforms it to a liquid in the condenser coil. The obtained product was employed by the evaporator to complete the task. Outside the house is where the compressor and condenser are located.

### 2.3.3 Thermostat



*Figure 10: Aircond Thermostat*

*Source: Google Image*

The thermostat regulates the heat energy inside and outside of an air conditioning system to keep the temperature constant. A thermostat can be set manually or automatically, depending on the design.

### 2.3.4 Evaporator



*Figure 11: Aircond Evaporator*

*Source: Google Image*

Inside the house, near the furnace, evaporators are air conditioning components. An extremely thin tube connects it to the condenser. The air conditioner converts the high-pressure gas into a low-pressure liquid. Due to the decreased pressure, the liquid becomes a gas. The fluid, also known as the refrigerant, is what removes the heat from and cools it down. In order for the fluid to be compressed again by the compressor, the evaporator releases it as a gas. All of this occurs in a cyclic pattern.

### **2.3.5 Air Handler and Blowing Unit**

The components of this air conditioner work together to pull air to the evaporator and circulate cool air around the room. The passage of airflow in a room is facilitated by a duct system.



## **2.4 CLASSIFICATION OF AIR CONDITIONING SYSTEM**

An air conditioning system's classification in order to identify one type from another. This serves as a foundation for determining the best air conditioning system for the building's needs. There are three types of air conditioners, each of which has its own classification:

### **2.4.1 Based on major function:**

- ✓ Comfort air conditioning such as hotels, homes, offices and more.
- ✓ Commercial air conditioning such as malls, supermarket and more.
- ✓ Industrial air conditioning such as processing, laboratories and more.

### **2.4.2 Based on the season in the year:**

- ✓ For summer comfort, a summer air conditioner that regulates all four atmospheric conditions.
- ✓ The purpose of a winter air conditioner is to keep you warm during the cold months.
- ✓ A year-round air conditioner with heating and cooling components and an automatic control that can function in any weather condition throughout the year.

### **2.4.3 Based on equipment arrangement**

- ✓ Including a unitary system and central system.

## 2.5 TYPES OF AIR CONDITIONING SYSTEM

### 2.5.1 Central Air Conditioners



*Figure 12: Central Air Conditioners*

*Source: Google Image*

The evaporator, condenser, and compressor are all stored in a single unit that is either on the roof or on a concrete slab near the foundation. It is suitable for a large home and wish to cool multiple room at once. A split system manages air through ducts installed in your home with a central air conditioning unit. A ducted system is another name for it. Ducts running through the outside wall or top of the house pull air from within the house and return cooled air to the unit. This air conditioner can also be used in connection with a set of heating coils or a natural gas heater.

Advantages:

- It cools all the rooms connected to ducts at the same time, resulting in a cooler, more regulated climate throughout the house in the shortest amount of time.
- Because cool air is circulated throughout the house, humidity is minimised, making the entire environment more comfortable.

Disadvantages:

- It uses a lot of electricity, which means increased utility bills.
- If an issue occurs in the ducts, such devices may lose affiance.
- Some people find the outdoor unit unsightly, but you can always hide your air conditioning unit in your backyard in a creative way.

### 2.5.2 Ductless Mini Split



*Figure 13: Ductless Mini Split*

*Source: Google Image*

For modern homes, ductless systems are an excellent option. An exterior compressor and condenser are combined with one or more indoor air-handling units in ductless mini-split systems. These devices have blowers attached to them and are installed on the wall. The indoor and outdoor units are connected by tubing, which flows refrigerant between them. These may be placed without taking down walls and allow for individual temperature control in each area. These types of air conditioners are considered to be considerably more energy efficient than some of the other alternatives available, but they can be expensive if you plan on placing one in each room to cover the entire house.

Advantages:

- It can be put anywhere without the need for ductwork or a lot of effort.
- It has the ability to manage the temperature of each room separately.

Disadvantages:

- For large homes, a single ductless mini-split unit is insufficient.
- Since a ductless mini-indoor split's unit is wall-mounted, it will be visible to the naked eye.

### 2.5.3 Window Units



*Figure 14: Window Unit Air Conditioner*

*Source: Google Image*

These are the most common types of single-room air conditioners. All of the components are contained in a single box, which is furnished with a single thermostat gauge that fits into a slot cut into the wall or window sill where the unit is installed. The filter on these air conditioners slides out, allowing it to be cleaned on a regular basis for maximum AC efficiency. These air conditioners include on-board controls and may also include a remote control.

Advantages:

- Window units are often less expensive to purchase and operate.
- Simple to set up and maintain
- Don't take up too much of your floor space.

Disadvantages:

- During operation, they might be noisy and are visible from the exterior of the house.
- They block the view out of a window and must be placed near an electrical outlet.
- Some window air conditioners are not really ideal for casement or oddly shaped windows and many are not compatible with all windows.

### 2.5.4 Portable Air Conditioner



*Figure 15: Portable Air Conditioner*

*Source: Google Image*

This works in the same way as a window, but it may be moved from room to room. It is self-contained and freestanding on the floor. They are quite convenient and smaller versions can even be used for kennels or restrooms. They only require an outlet to power on and a window to funnel out the exhaust air. Single-hose portable air conditioners take in air from inside a room and exhaust it outside. Alternatively, a dual-hose system sucks air from the outdoors through one hose, cools the compressor, and then exhausts the air through the other hose.

Advantages:

- Setup is quick and easy.
- They may be simply moved around the house and do not need to be installed permanently.
- For spot cooling, this is a good solution.
- When not in use, it is simple to store.

Disadvantages:

- During operating, these units make a lot of noise.
- It is also difficult to keep larger spaces cool.
- Portable units with hoses must be positioned near a window, and the hose obstructs the lower portion of the window.

### 2.5.5 Hybrid Air Conditioner

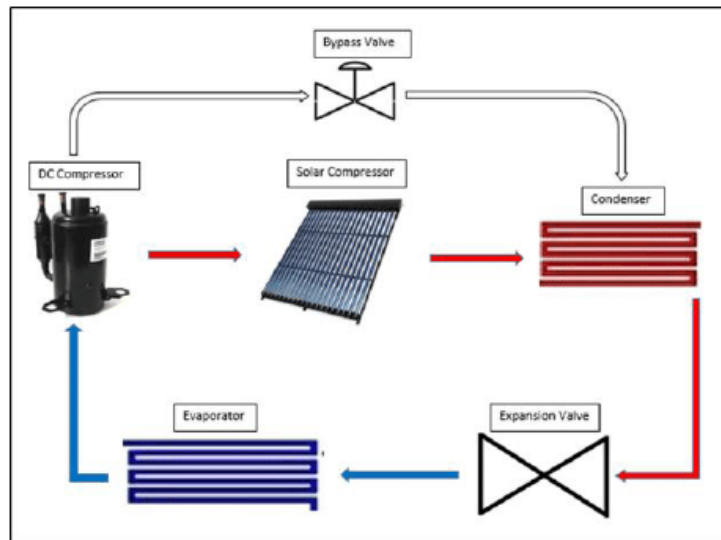


Figure 16: Solar Hybrid Air Conditioning System

Source: Google Image

A hybrid system combines a gas furnace with an electric air-source heat pump to provide a cost-effective and efficient heating and cooling solution. To minimize money and energy while running the system, hybrid AC unit systems alternate between burning fossil fuels and using electricity. The heat pump operates regularly in the summer, drawing heat from the house and transferring it outside. In the winter, the hybrid heat pump system pulls heat from the outside environment and distributes it throughout the house.

Advantages:

- Increase indoor comfort while lowering utility costs.
- Reduce your environmental impact.

Disadvantages:

- The significant initial setup costs
- In the long run, breakeven may occur.

### 2.5.6 Geothermal Air Conditioning System

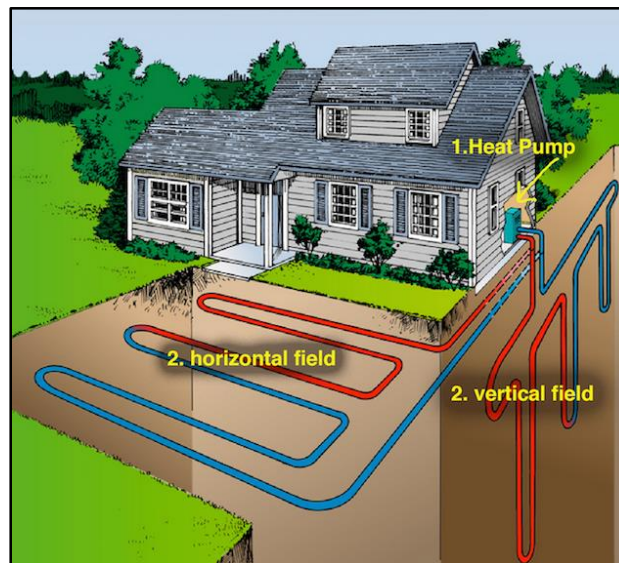


Figure 17: Geothermal Air Conditioning System

Source: Google Image

Geothermal air conditioning system is a relatively recent approach that works by harnessing the earth's insulating characteristics. Geothermal technology takes advantage of the fact that temperatures under 4 to 6 feet of soil stay stable throughout the year, depend on the weather to heat and cool homes more efficiently. The pipe in this system is made up of a loop that circulates water between your home, a heat pump and the ground. Setting them up underground necessitates a lot of effort.

Advantages:

- In terms of energy use, it is quite efficient.
- It has a longer life expectancy than other forms of heating and cooling systems.

Disadvantages:

- Because loops are built in the ground, installation is dependent on the location.
- The setup cost is very high.

## **CHAPTER 3: AIR CONDITIONING PROJECTS IN IXORA HOTEL**

### **3.1 INTRODUCTION OF PROJECT**

Air conditioning is a very essential part in Ixora Hotel to ensure guests comfort for relaxing and unwind in the optimum style. This comfort is provided by air conditioning, which uses a complete solution that combines heating, cooling and ventilation for silent, draft-free operation and restful sleep. Hotels can deliver air comfort and low operating costs without sacrificing style thanks to flexible installation schemes. After all, whether guests are staying for a short or extended stay, they will expect to sleep, eat, and relax in a relaxing environment. Furthermore, air conditioning is not only useful during the summer months; it may help regulate the temperature of a hotel property all year. Hotel air conditioning has improved dramatically in recent years, and it is now one of the most energy-efficient ways to heat and cool large structures.

But why air conditioning are so important in hotel? It is because when it is hot outdoors, getting a decent night's sleep may be hard and the last thing a hotel wants is for their visitors to wake up irritated and annoyed because their room is too hot. Keeping this in mind, climate management is critical. By ensuring that all hotel rooms have air conditioning, visitors will be able to adjust the temperature of their rooms to meet their specific needs. Other common areas of the Ixora hotel, such as any leisure facilities, restaurants, bars, and reception areas, are also equipped with air conditioning. Regardless of the outside temperature, you can ensure that all parts of the hotel are cool, comfortable, and appealing.

Mr. Rosli, the Head of the Department of Maintenance, has a number of projects regarding air conditioning systems in the works. This air conditioning project will be scheduled on specific days in order to identify the air conditioning problem and then implement the appropriate solution to ensure that the problem does not occur again. During air conditioning project, the room or area that are involves will be closed and monitored from time to time before, during after the project is being done.



### 3.2 TYPES OF AIR CONDITIONING IN IXORA HOTEL

The total of air conditioning in Ixora Hotel is 470 units including all area.

<b>LEVEL</b>	
<b>BASEMENT 2 (B2)</b>	
<b>LOCATION</b>	<b>AC HOSE POWER</b>
Maintenance Office	1.5 Hp
Purchasing Office	1.5 Hp
Receiving Office	1.5 Hp

<b>LEVEL</b>	
<b>BASEMENT 1 (B1)</b>	
<b>LOCATION</b>	<b>AC HOSE POWER</b>
HR Office (A)	1.5 Hp
HR Office (B)	1.5 Hp
Security Office	1.5 Hp
Staff Cafeteria (A)	2 Hp
Staff Cafeteria (B)	1.5 Hp
Linen Store	1.5 Hp

<b>LEVEL</b>	
<b>GROUND FLOOR (G)</b>	
<b>LOCATION</b>	<b>AC HOSE POWER</b>
Kitchen Office	1.5 Hp
Kitchen Pastry	1.5 Hp
Restaurant (1)	5 Hp
Restaurant (2)	5 Hp
Cashier Lobby	5 Hp
Counter F/O	5 Hp
Lobby	5 Hp
F/O Room	5 Hp

*MAINTENANCE WORK AND PRACTICE WORK FOR AIR CONDITIONING*

Rental Corridor	5 Hp
GM Office	2 Hp
Fire Control Room	1.5 Hp
MDF Room (A)	1.5 Hp
MDF Room (B)	1.5 Hp
Server Room	1.5 Hp

<b>LEVEL 1</b>	
<b>LOCATION</b>	<b>AC HOSE POWER</b>
Meeting Room	1.5 Hp
F&B Office	1.5 Hp
Finance Office	1.5 Hp
Finance Controller	1.5 Hp
Director (1)	1.5 Hp
Director (2)	1.5 Hp
OM Office	1.5 Hp
Sales Office	1.5 Hp
Finance Area	4 Hp
Sales Area	5 Hp
Training Room	1.5 Hp
Function Room 1 (A)	5 Hp
Function Room 1 (B)	5 Hp
Function Room 2 (A)	5 Hp
Function Room 2 (B)	5 Hp
Function Room 3 (A)	5 Hp
Function Room 3 (B)	5 Hp
Function Room 4 (A)	5 Hp
Function Room 4 (B)	5 Hp
Function Room 5 (A)	5 Hp
Function Room 5 (B)	5 Hp
Function Room 5 (C)	5 Hp
Function Room 5 (D)	5 Hp

Lobby 1-B 2-B 3-B 4-B 7-C 9-C 10-C	10-15 Hp
VIP Room	4 Hp
Male Surau	1.5 Hp
Female Surau	1.5 Hp
Ballroom No. 1 No. 2 No. 3 No. 4 No. 5 No. 6	12 Hp 12 Hp 12 Hp 12 Hp 12 Hp 12 Hp

<b>LEVEL 2 - 11 HOTEL ROOM</b>	
<b>LOCATION</b>	<b>AC HOSE POWER</b>
Room (A)	2 Hp
Room (B)	1 Hp
Corridor No. 1 No. 2 No. 3 No. 4	1 Hp 1 Hp 1 Hp 1 Hp
Lift Lobby 1/2 3/4	2 Hp 2 Hp

**3.3 SCHEDULE OF SERVICES AND CLEANING AIR CONDITIONING FILTER FOR YEAR 2021**

<b>JANUARY, APRIL, JULY, OCTOBER</b>	
LEVEL	UNIT
Basement 1	11
Basement 2	4
Ground Floor	14
Level 1	40
Level 2	38
Level 3	43
Total	150

<b>FEBRUARY, MAY, AUGUST, NOVEMBER</b>	
LEVEL	UNIT
Level 4	43
Level 5	43
Level 6	39
Level 7	39
Total	164

<b>MARCH, JUNE, SEPTEMBER, DECEMBER</b>	
LEVEL	UNIT
Level 8	39
Level 9	39
Level 10	39
Level 11	39
Total	156

### 3.4 PROJECT 1 (REPLACING 1 UNIT MOTOR BLOWER FAN)

The first air conditioning project in Ixora Hotel is changing 1 unit motor blower fan of air conditioning for room 331. This is because the previous one is already broken and cannot functioning well. Blower fans with motors are crucial in air conditioning systems. They create air currents that circulate cool air while removing heat from the interior. The air conditioner will not be able to cool the room if the fan fails. Blower motors often have a longer lifespan. However, motor blower fan can burn out over time, so if the air conditioning unit's blower motor is old, it could be time to replace it. An air conditioner that continues to run without blowing cool air is one indicator of a broken blower motor.

After checking the motor blower fan the causes is from a tripped circuit breakers to a faulty thermostat. However, it is also possible that the blower motor has stopped working. Maintenance team got complain from Housekeeping team about this air conditioning problem. Due to this problem, Maintenance department has block this room from sales during this project to fully utilise in repairing the air conditioning. This project takes about 3 days to complete.



*Figure 18: Motor Blower*

### 3.4.1 The Process during Project 1

The first process in replacing motor blower fan is making sure that the power to the unit is off and the power is disconnected to avoid any unnecessary thing. Since the air condition is place on the ceiling, maintenance staff must cut the ceiling using a saw as shown in Figure 19. The maintenance department has to cut the ceiling in order to bring out the old motor blower fan that are broken. After bring out the motor blower fan, disconnect the wires that run in the board. Then, take apart the motor blower fan from its guard grilled to change a new one.

A new motor blower fan must be the same model as the previous one. Then, reattach a new motor blower fan on the guard grilled and tighten back with screws. Reroute the motor wires to their connection points, making certain that the wires are secured, are not pinched between panels, and cannot come in contact with the rotating fan blade. After that activate the condensing unit and adjust the thermostat to make it work. Maintenance staff must check to see whether the motor is on and if there are any unusual noises or vibrations. On the condensing unit, replace the service panels. Measure and record the motor's amperage draw with the clamp-on ammeter. The room is still under monitor by the maintenance staff to check its performance. A new temperature will be taken using a temperature meter will be recorder and that room will be released after the air conditioning run as expected to ensure guest comfort.



*Figure 19: Cutting Ceiling*

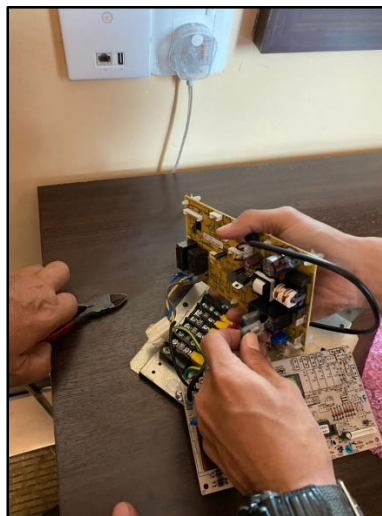


*Figure 20: Taking Out the Motor Blower Fan Process*



Motor Blower Fan

*Figure 21: Motor Blower Fan*



*Figure 22: Reconnecting the Wires*



*Figure 23: Plastering Work*

The ceiling must be plaster back to keep its image. After that, it will be paint using white paint at that area.



*Figure 24: Painting Work*



*Figure 25: Temperature Monitor*



### 3.5 PROJECT 2 (ROOM 431)

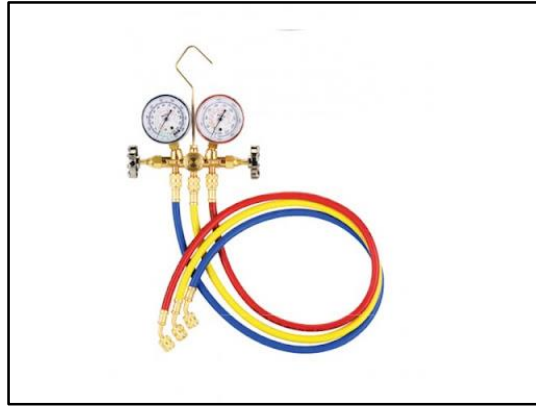
For room 431, the complaint come from the guest itself by stating the air conditioning in that room not cool enough even though the temperature are at the lowest point which is 16°C. So the hotel management take further action by changing room for the guest for the maintenance team to check the compressor of the air conditioning in room 431. The first problem that maintenance staff suspect is leaking gas. So the maintenance staff top up gas by using manifold gauge to read the corresponding temperature, leak testing and read high pressure and low pressure of air conditioning system.

Other than that, the capacitor in that air conditioning compressor also broken. It is because when the capacitor is being tested it show below 50 Hz which is only 30 Hz, so the capacitor is no longer appropriate to be use. The tested is being done by using clamp meter. So the new capacitor is being installed to that compressor.

After that, the cooling coil is being clean by using chemical substance. The evaporator coil is less likely to become dirty if the filter is kept clean. The evaporator coil, on the other hand, will continue to gather dirt over time. This dirt disrupts airflow and insulates the coil, lowering its heat-absorbing capacity. The evaporator coil must be check once a year and clean it as needed to avoid this problem. After settle all the process, room 431 is still in under maintenance team monitoring. A new temperature is also being taken from time to time.



*Figure 26: Gas Top up Process*



*Figure 27: Manifold Gauge  
Source: Google Image*



*Figure 28: Cleaning Cooling Coil using Chemical Substance*



*Figure 29: Cleaning Chemical Substance using Water*



*Figure 30: Capacitor Testing Process*



*Figure 31: Clamp Meter*

## **CHAPTER 4: THE ISSUES OF AIR CONDITIONING SYSTEM AT IXORA HOTEL**

### **4.1 ISSUES AND PROBLEMS**

#### **4.1.1 Safety of Maintenance Staff**

This issues is one of the obvious problem that Maintenance Staff have to face every day especially when they have to check outdoor compressor especially for the higher level. This is because there is no safety gear that are provided for them during working in the higher place. After doing some observation, there are no place to allocated the safety gear as there no hook at the wall or ceiling for the maintenance staff to hang on their safety gear. The maintenance staff may be experience but incident can still occur if the miss step or anything. One of the risk that can be identify is falling from higher place and it will give fatal injury to the staff. So the Ixora Hotel must have a solution to solve this problem.

#### **4.1.2 Inadequate Maintenance**

The maintenance department of Ixora Hotel itself are short staff due to Pandemic Covid-19. So the existing staff do not have enough time to do air conditioning servicing and cleaning that has been schedule every month. If the air conditioning is left longer it will allow filters and air conditioning coils to become dirty, the air conditioner will not work properly and the compressor or fans are likely to fail prematurely. This will cause problems when guest check in into that room and it will affect the image of the company. Some may be understanding but some are not.

#### **4.1.3 Air Conditioner Is Not Turning On**

This occurs when the air conditioning thermostat batteries fail to work or turn on. If the batteries are dead, replace them. Check the thermostat settings to see if the cooling mode is on with your selected temperature settings if the batteries are in good working order. Check the circuit breaker if the thermostat is turned on but the air

conditioner is still not working. The air conditioner will not turn on if the circuit breaker is tripped. By turning the switch off and on again, the circuit breaker can be reset.

#### **4.1.4 Air Conditioner Making Noises**

An air conditioner can make different sounds depending on the type of problems. Sometimes the noises can be annoying especially when it happens in a guest room since it can cause discomfort during their stay. These noises are often a sign it is time to repair or replace the system.

## **CHAPTER 5: CONCLUSION**

As a conclusion maintenance department is very important for a building to make sure that the building is in a good condition and last for a long time especially for a hotel building. Therefore, almost all buildings already have their respective maintenance parties. There are many fractional aspects for the maintenance of a building such as planned and unplanned maintenance. For Ixora Hotel, their maintenance for that building is good based on our observation because this building do not have any critical problems related to maintenance and the maintenance team has an efficient way in solving any problems that are occurred Ixora Hotel especially when it involving guest comfort.

A proper maintenance budget for a building is one of the important factor to ensure the maintenance services are being done from time to time. So that the appearance and the function of the building can be used by the occupants. The maintenance budget will derived the building to stay still.

## CHAPTER 6: RECOMMENDATION

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CHAPTER 7: APPENDICES

7.1 MAINTENANCE SCHEDULE

7.1.2 CIVIL AND STRUCTURE WORK

NO.	DESCRIPTION	FREQUENCY						
		D	W	M	3M	6M	Y	2Y
1.	<p><b>FLAT ROOF</b></p> <ul style="list-style-type: none"> <li>○ Waterproofing                             <ul style="list-style-type: none"> <li>- Check condition of waterproofing for damages</li> </ul> </li> <li>○ Drainage system</li> <li>○ Parapet wall</li> </ul>					√		
2.	<p><b>WALL</b></p> <ul style="list-style-type: none"> <li>○ Wall condition                             <ul style="list-style-type: none"> <li>- Check for any damages or cracks</li> </ul> </li> <li>○ Dampness                             <ul style="list-style-type: none"> <li>- Check for any sign of dampness, algae, peeling paint, etc</li> </ul> </li> <li>○ Paint condition</li> <li>○ Curtain wall, window and glazing                             <ul style="list-style-type: none"> <li>- Check for cracks, defective glass panel, leakage, fixtures, corrosion, etc</li> </ul> </li> <li>○ Internal partition                             <ul style="list-style-type: none"> <li>- Check the accessories, fixtures and finishing</li> </ul> </li> </ul>				√		√	√
3.	<p><b>CEILING</b></p> <ul style="list-style-type: none"> <li>○ Ceiling finishes condition</li> </ul>							

	- Inspect ceiling board for any damages and its finishes			√				
4.	<p style="text-align: center;"><b>BEAM</b></p> <ul style="list-style-type: none"> <li>○ Condition of the beam</li> <li>- Check the condition of the beam for any of sign of damage or cracks</li> </ul>						√	
5.	<p style="text-align: center;"><b>COLUMN</b></p> <ul style="list-style-type: none"> <li>○ Condition of column</li> <li>- Check the condition of the column for any sign of damage or cracks</li> </ul>						√	
6.	<p style="text-align: center;"><b>FLOOR</b></p> <ul style="list-style-type: none"> <li>○ Condition of the floor</li> <li>- Check condition of the floor for any sign of damage, cracks or leakage</li> <li>○ Condition of floor finishes</li> <li>- Check the condition of floor finishes</li> <li>- Check for defective finishes</li> </ul>						√	√
7.	<p style="text-align: center;"><b>PAINTING</b></p> <ul style="list-style-type: none"> <li>○ Inspect painted surfaces such as wall, ceiling, floor, doors, fencing, gates, etc. at all areas case of stains, corrosion and defects and perform necessary painting to match existing if required</li> <li>○ Repaint road lines, curb, parking lines and road numbers</li> </ul>							√
								√

8.	<p><b>BUILT-IN FURNITURE</b></p> <ul style="list-style-type: none"> <li>○ Inspect integrity, accessories, and fixtures</li> <li>○ Maintain accessories, fixtures, and finishes</li> <li>○ Inspect for termite attack</li> <li>○ Inspect for borers, beetles attack</li> <li>○ Inspect for fungus attack</li> </ul>				√			
9.	<p><b>CARPET</b></p> <ul style="list-style-type: none"> <li>○ Inspect for surfaces for defect</li> </ul>						√	

**7.1.2 BUILDING SERVICES AND FACILITIES WORK**

NO.	DESCRIPTION	FREQUENCY						
		D	W	M	3M	6M	Y	2Y
1.	<p><b>DRAINAGE AND SEWERAGE</b></p> <ul style="list-style-type: none"> <li>○ Check the drainage for any cracks and damage</li> <li>○ Check sewer networks for the collection of wastewater, pipes, conduits, and ancillary works from its point of origin to treatment works prior to discharge back into the environment.</li> </ul>						√	
2.	<p><b>WATER SUPPLY</b></p> <ul style="list-style-type: none"> <li>○ Check water system from corrosion                             <ul style="list-style-type: none"> <li>- Check the water cistern for any damage or corrosion</li> </ul> </li> <li>○ Check the water pump</li> </ul>			√			√	

	<ul style="list-style-type: none"> <li>- Check the water pump for any damage and functionality</li> <li>o Check the integrity of the tank.</li> <li>- Check the integrity of the water tank</li> </ul>			√				
3.	<p><b>SECURITY SYSTEM</b></p> <ul style="list-style-type: none"> <li>o Check the CCTV components</li> <li>- Check the CCTV are operating correctly</li> <li>- Check the thumb print</li> </ul>			√				
4.	<p><b>PLUMBING AND SANITARY FITTINGS</b></p> <ul style="list-style-type: none"> <li>o Check domestic water pump, panel, and its related components, adjust, repair, and replace if necessary</li> <li>o Check sump pumps, panel, and its related components, adjust, repair, and replace if necessary</li> <li>o Insert toilet fittings such as taps, WC, flushing system, ball valve, washbasin and repair or replace when necessary</li> <li>o Check piping for leakage and repair</li> <li>o Check all internal/external floor traps for blockage and maintain</li> <li>o Inspect float sensors for correct indication. Adjust, repair, or replace to function and serviceable</li> </ul>			√				

**7.1.3 MECHANICAL WORK**

NO.	DESCRIPTION	FREQUENCY						
		D	W	M	3M	6M	Y	2Y
1.	<p><b>LIFT</b></p> <ul style="list-style-type: none"> <li>○ Check lift components</li> </ul>				√			
2.	<p><b>AIR CONDITIONING SYSTEM</b></p> <ul style="list-style-type: none"> <li>○ Check all of component air conditioning system</li> </ul>			√				
3.	<p><b>FIRE FIGHTING</b></p> <ul style="list-style-type: none"> <li>○ Check components of each fire fighting system that available in the office</li> </ul>					√		

**7.1.4 ELECTRICAL WORK**

NO.	DESCRIPTION	FREQUENCY						
		D	W	M	3M	6M	Y	2Y
1.	<p><b>ELECTRICAL SYSTEM</b></p> <ul style="list-style-type: none"> <li>○ Check component in electrical system                             <ul style="list-style-type: none"> <li>- Switch room</li> <li>- Fuse switch</li> <li>- Distribution board</li> <li>- Luminaries</li> <li>- Socket outlets</li> <li>- Motor, protection equipment and motor pump</li> <li>- Outdoor lighting</li> </ul> </li> </ul>					√		

2.	<p><b>GENERATOR SET SYSTEM</b></p> <ul style="list-style-type: none"> <li>○ Removing of worn out parts or upgrading the components             <ul style="list-style-type: none"> <li>- Check for fluids levels</li> <li>- Battery inspection and cleaning connections</li> <li>- Load bank test</li> <li>- Verify control panel</li> <li>- Change fuel and air filters</li> </ul> </li> </ul>	√					
3.	<p><b>SUBSTATION SYSTEM</b></p> <ul style="list-style-type: none"> <li>○ Check the substation equipment             <ul style="list-style-type: none"> <li>- Circuit breakers</li> <li>- Power transformers and reactors</li> <li>- Instrument transformers -CT &amp; CVT</li> <li>- Disconnectors /earthing switches</li> <li>- Surge arresters</li> <li>- Capacitor banks</li> <li>- Earth grid and earth pits</li> <li>- Wave traps and PLCC</li> <li>- Battery and battery charges</li> <li>- Relays and meters</li> <li>- ACDB, DCDB AND DG sets</li> <li>- Busbar /clamps/droppers/BPI</li> </ul> </li> </ul>	√					

**7.1.5 HOUSEKEEPING**

NO.	DESCRIPTION	FREQUENCY						
		D	W	M	3M	6M	Y	2Y
1.	<p><b>CLEANING WORK</b></p> <ul style="list-style-type: none"> <li>○ Office area                             <ul style="list-style-type: none"> <li>- Sweep and mop</li> <li>- Disposal waste</li> <li>- Clean glass wall and door</li> </ul> </li> <li>○ External compound                             <ul style="list-style-type: none"> <li>- Sweep any rubbish</li> <li>- Clean and clear parameter drain</li> <li>- Mopping</li> </ul> </li> <li>○ Hotel room                             <ul style="list-style-type: none"> <li>- Clean with a detergent, disinfectant, all sink, vanity counter, toilet, and urinals, beginning with seats working down</li> <li>- Clean light switches, doors, partition, and walls to remove fingerprints, spills, and other marks</li> <li>- Clean and polish all mirrors, soap dispenser, sanitary napkin dispenser, flush meters, faucets, shelves, piping, toilet hinges</li> <li>- Furnish and refill sanitary napkins dispensers and trash bags for all bins, including</li> </ul> </li> </ul>	√						

	<p>sanitary bins. Refill soap dispensers</p> <ul style="list-style-type: none"> <li>- Empty and clean paper tower and sanitary napkins disposal bin. Replace plastic bags</li> <li>o Waste disposal             <ul style="list-style-type: none"> <li>- Collect and dispose all general wastes from the office building to a waste disposal centre designated inside the building compound</li> <li>- Collect and dispose all general wastes from all spaces and surfaces outside the office building and the surrounding area associated with the building to a waste disposal centre designated in the building compound</li> <li>- Ensure all collected waste at the disposal centre were unloaded and transported to a public waste disposal centre allocated by The Local Authority</li> <li>- Maintain and clean garbage bins and waste disposal centre such that no bad odour, insect, and rodent are present</li> </ul> </li> </ul>	√						
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	<ul style="list-style-type: none"> <li>○ Fire pump room, AHU, electrical and stores             <ul style="list-style-type: none"> <li>- Sweep and keep free from litter</li> <li>- Wipe wall to remove dirt, stain, and foreign materials</li> <li>- Damp wipe clean</li> <li>- Thorough vacuum, clean floor, and other fittings</li> </ul> </li> <li>○ Landscape             <ul style="list-style-type: none"> <li>- Watering the plants</li> <li>- Loosening the soil</li> <li>- Check vegetation surrounding</li> <li>- Grass cutting and prunes the hedges</li> </ul> </li> <li>○ Hardscape             <ul style="list-style-type: none"> <li>- Check parking line condition and curb colour</li> </ul> </li> <li>○ Pest control             <ul style="list-style-type: none"> <li>- Mosquitoes fogging</li> <li>- Bugs and nest cleaning</li> <li>- Trim the shrubs</li> </ul> </li> </ul>		<p>√</p> <p>√</p>	<p>√</p> <p>√</p>				
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7.2 IXORA HOTEL'S CERTIFICATE



Figure 32: Company License



Figure 33: Top Rated Award



Figure 34: Penang Green Citizens Award

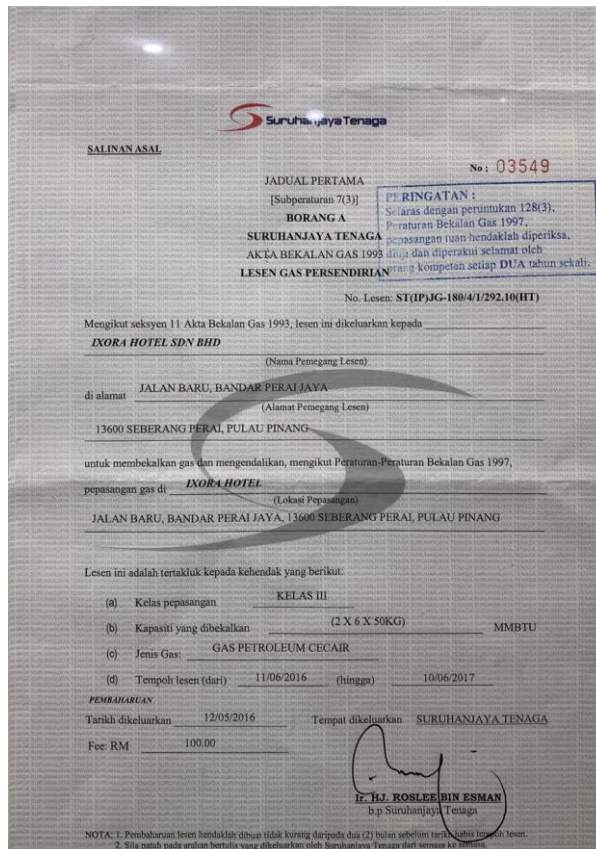


Figure 35: Suruhanjaya Tenaga License



Figure 36: Membership Certificate of Malaysia Association Hotel



Figure 37: Fire Certificate

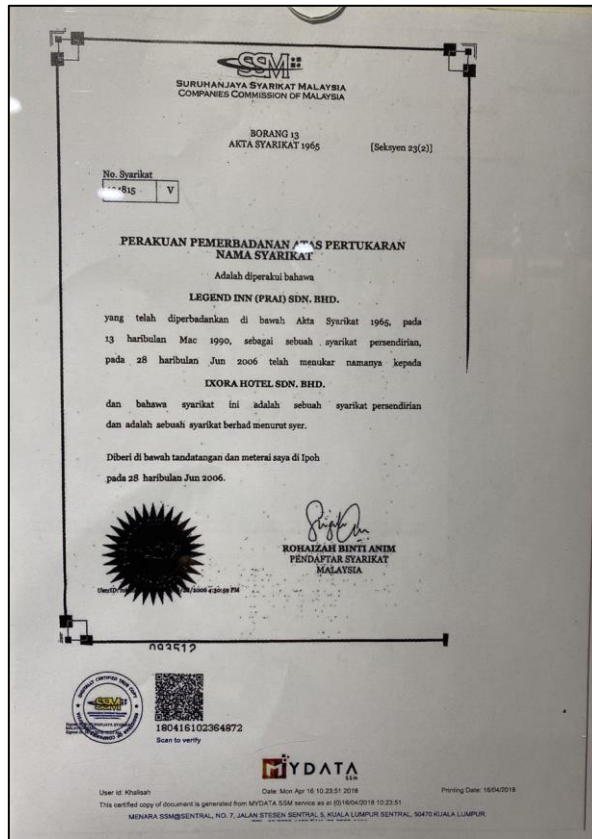


Figure 38: Company Commission of Malaysia Certificate



Figure 39: Registration Certificate

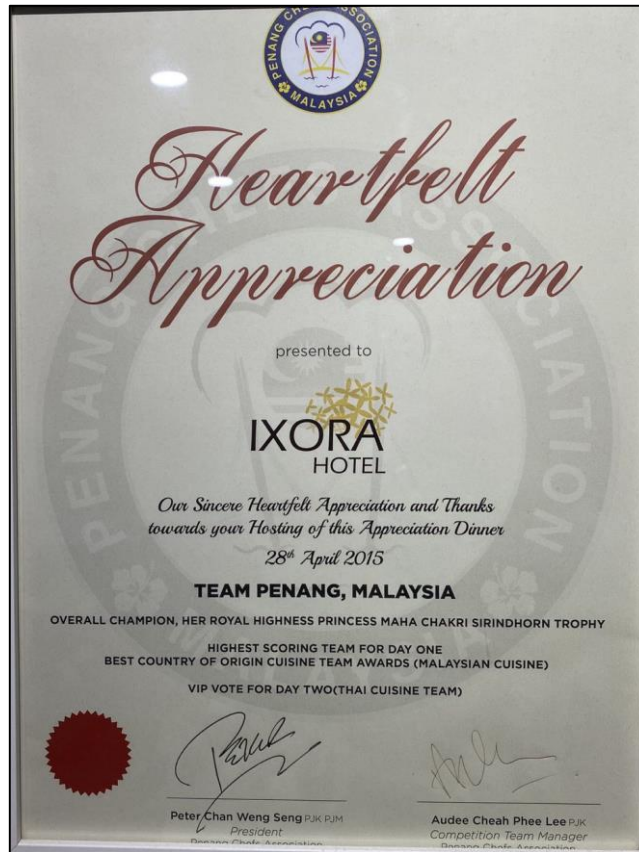


Figure 40: Appreciation Dinner of Team Penang



Figure 41: MBSB Certificate on Waste Management

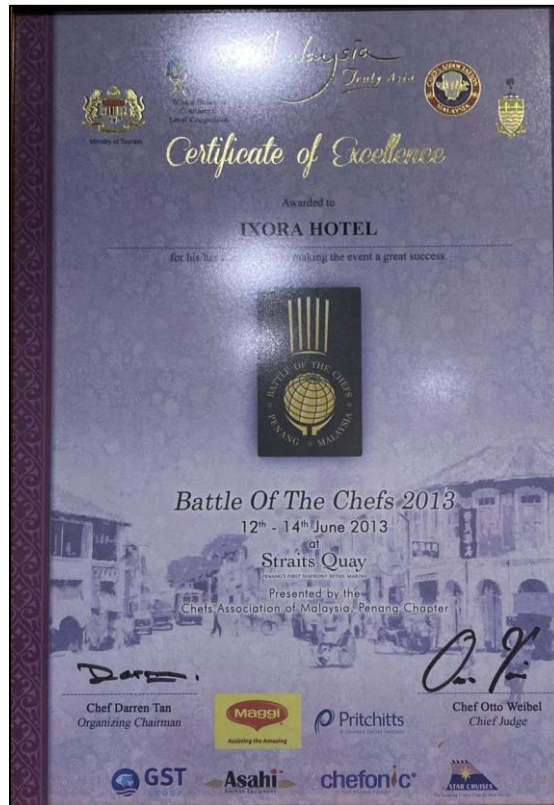


Figure 42: Certificate of Excellent



Figure 43: Certificate of Appreciation