



**DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
(PERAK)**

MAINTENANCE IN RESIDENTIAL BUILDING

Prepared by:

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DEPARTMENT OF BUILDING
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(PERAK)

DECEMBER 2019

It is recommended that the report of this practical training provided

by

Nurul Nabila Husna Binti Zulkifli
2017206922

Entitled

Maintenance in Residential Building

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

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references are stated here in, prepared during a practical training session that I underwent at MKH Berhad for a duration of 20 weeks starting from 5 August 2019 and ended on 20 December 2019. 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.

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Date : 13 December 2019

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Thank you so much.

ABSTRACT

The value and safety of the building depend on the maintenance in the building itself. In order to make sure the operation runs smooth, it must be through a hard process such as maintenance have to maintain all the time by the people in charge of that problem that occurs on the buildings and committed people. Despite the location and a lot of property had been born, the maintenance for all the buildings increases. This report aims to improve the value of the buildings and make sure the building can be used for a long time depends on the good maintenance of the buildings. The objectives of this report to identify the maintenance that usually use in a residential building in order to keep a safe environment in the building. When the maintenance had been maintaining wisely and keep on the right track and always on time, it easier for any problem to be solved quickly and can be handled professionally. By using observation, semi-structured interviews and informal conversation on daily basis with the professional people that handled this case, this report concludes clear maintenance for a residential building based on the Strata Management Act 2013 and 2015 in order to keep the value of the buildings.

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CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

According to The British Standard 3811-1974, maintenance is the combination of any action carried out to retain an item in order or restore it to a state in which it can perform its required function. The purposes of maintenance in building is to make sure all the operating condition and building services in a good condition while restore them to their original standard. The maintenance in buildings can be classified into three which is routine maintenance, preventive maintenance and remedial maintenance. Nowadays, a lot of building had been built in urban areas and not excluded, the city center. All this buildings was in a good condition and one of the reason of this can be maintained because it had treated in a good manners and maintained properly by the maintenance team. As a developers, in order to make sure all the things run well is to maintain the value of the building itself to make sure the property value in a high value and make sure all the owners lived in a good environment. The most important part that required maintenance team to be focused more is on the high rise residential building because there is a lot of things that required them to be more take action than a landed property.

High rise residential building consists of a lot of the unit sharing the lot on the same land. This high rise building usually have a lot of unit and provided with basic amenities and facilities including covered parking, swimming pool, elevators, garbage and also 24 hour security system to make sure all the owners can use the buildings well. To make sure all the facilities were in a good condition all the time, all these basic facilities should be well maintained by the team and the owners itself must follow the rules and regulations to make the services could give benefits and simplify to all the users. Previous studies mentioned that high –rise residential buildings must have one body to manage these facilities provided (Abd Wahad. S.R.H., A.Sairi, 2015). Management Corporation (MC) is a body that is responsible for managing and maintaining all the common properties of high-rise buildings

(Yusoff, Y.M., Tawil, N.M., 2011). Management Corporation was established after the completion of the transfer of strata title in respect to all the parcels by the original proprietor under section 64 of the Strata Titles Act 1985. One of their responsibilities is managing and maintain the common property for the sake of all the users.

Basically, facilities management includes maintenance management and resident satisfaction, which must be managed effectively (Che-Ani, A.I., Mustafa, 2011). Maintenance management will work efficiently if the maintenance problems conducted refers to the schedule without delaying any types of maintenance. If the maintenance schedules do not be followed, it will be classified as insufficient and automatically will increase the amount of the maintenance cost and charges. But, if the maintenance team had followed the standard and do the maintenance regularly, it can't be the maintenance management faults if the buildings it doesn't meet any satisfaction if the resident itself do not aware with their own environment such as the damage had been found near their unit or basic amenities that broke because of the people or the nature like wind. The management body must cooperate with the resident in order to achieve maintenance management satisfaction. For example, the resident must pay the maintenance fees on time to avoid any delay on maintenance work and the resident must to look over all the facilities around them and immediately tell the management if any damage had found. They also have to participate in any event that objectified to maintain the common properties. The resident should also look after their common properties, including the swimming pool, playground, and gymnasium, which belong to their place (Abd-Wahab, S.R.H., A., Sairi, 2015).

So, all the parties which are the maintenance management, the management corporation and the resident should play the roles in order to maintain the buildings such in good condition. If the maintenance is regularly done, it will affect the maintenance cost and the users will live in a good environment without having any problem regarding maintenance. These facilities must be maintained well to make sure these buildings function well. The aim of the maintenance in residential

buildings which is to maintain the value of the buildings will be achieved if the maintenance had been handled properly with strong cooperation from all parties.

This scope of the study is about maintenance in residential buildings. Mostly, the project and the building that run under MKH Berhad are high-rise buildings and most of them need proper maintenance to maintain the building. MKH Boulevard which is located at Jalan Changkat, Bandar Kajang is a high-rise building that consists of shops, offices and unit houses and also a basement and 8 levels of car parking. The study is focused on the main parts of maintenance in the residential building, how it works and the solution needed when the problem comes in the building.

1.2 Objectives

To learn in detail about the operation of the high rise residential property, it needs 3 objectives:

- 1.2.1 To identify the methods of maintenance in residential building
- 1.2.2 To identify the common preventive maintenance in the residential building
- 1.2.3 To identify common corrective maintenance of residential building

1.3 Methods of Study

To achieve the objectives, a few methods used to obtain the data and information regarding this task. Moreover, the research method is evidence of the research conducted. The types of methods being used for this research were as the following:

a) Observation

Observation method is observing the way of the professional such as engineer and the main contractor had deal with the problem that occurred when the operation of the building not operated smoothly and give such a hard time to the users of the building itself. The information can be taken in a picture so that the knowledge can be gained in duration of 20 weeks.

b) Interviews

The interview also gives a lot of knowledge. During the maintenance, an unstructured interview had done with the main contractor, sub-contractor and also the foreman itself. Example, the parties that majorly involved in this interview are site supervisor, engineer, foreman, main-contractor, sub-contractor, and labor.

c) Document reviews

Document reviews give such a big help when there is a lot of things need to be review in printed documents. Printed documents need to be review to get data and to see how the operation and maintenance are done in the high rise building. Example, drawings, books, tender, plans, and letter.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Originally, MKH was a private limited company in 1979 under the name of Srijang Bena Sdn. Bhd. Then, it's changed the name to Srijang Holdings and then to Metro Kajang Holdings Sdn. Bhd. It was converted to a public limited company in 1994 and known as Metro Kajang Holdings. In 2011, it changed to MKH Berhad from Metro Kajang Holdings Berhad. It represented MKH's transformation into an elite, regional brand that is built on more than 36 years of innovation and growth. MKH always improving people's lives by building good quality homes while in 2008, was marked the Group's foray into oil palm plantation.

MKH has changed into a Metropolitan developer by venturing into urban circles such as Damansara, Bangsar, Mont Kiara, Shah Alam, Cheras, Petaling Jaya and other parts of Kuala Lumpur. The group has contributed a lot of things to improve the quality of people's lives through integrated townships, quality developments and well-designed communities for people to call home. Until now, the group has developed more than 30,000 units of mixed development projects with a value exceeding RM 12.0 billion. Some of the future project from company will be built near to the upcoming Mass Rapid Transit (MRT) and Light Rail Transit (LRT) stations.

Not only involved in property sector, MKH also involved in oil palm plantation in East Kalimantan, Indonesia. Other than property development and oil palm plantation, MKH also involved in investment property, property management, construction, trading, furniture manufacturing to provide synergy and cost-efficiency.

The company was led by a few people who are truly professional in property development, property investment, construction and the other things that related to property. Tan Sri Dato' Chen Kooi Chiew holds the present as Executive Chairman and he was in property development and construction industries and also in the plantation sector. Tan Sri Datuk Chen Lok Loi was present as Managing Director and professional in property development and construction related businesses. Datuk Chen Fook Wah present as Deputy Managing Director and he has more than 11 years' experience in the plantation sector. Encik Mohamed Chudi bin Haji Ghazali present as Senior Independent Non-Executive Director while Datuk Mohammad bin Maidon, Encik Jeffrey bin Bosra and Haji Hasan bin Mohd Johan were presented as Independent Non-Executive Director.

The vision of MKH Berhad is to be a leading corporation in delivering sustainable growth while one of the missions of this company is to provide conducive working environment that will encourage the application of creative energy that is guided by best industry practices. That means, the company emphasizes the quality of the working environment to make sure the productivity of the company achieved the standard and the profit in property marketing, construction industries and it will make all the work completed on time.

2.2 Company Profile

Table 2.1 : Company Profile

| | |
|--------------------|---|
| Company's Name | MKH Berhad |
| Company No. | 50948-T |
| Established Date | 27th September 1979 |
| Registered Office | 5th Floor, Wisma MKH, Jalan Semenyih, 43000, Kajang, Selangor Darul Ehsan |
| Telephone No | |
| Fax No | |
| Website | www.mkhberhad.com |
| Sector | Property |
| Property Director | Dato' Chong Yong Han |
| Secretary | Christina Lee |
| Bank | RHB Bank, Hong Leong Bank & Maybank |
| Company Activities | Investment holding and providing management services |
| Activities | a) Property Development and Construction b) Plantation c) Hotel and Property Investment d) Trading e) Manufacturing |

2.3 Organization Chart

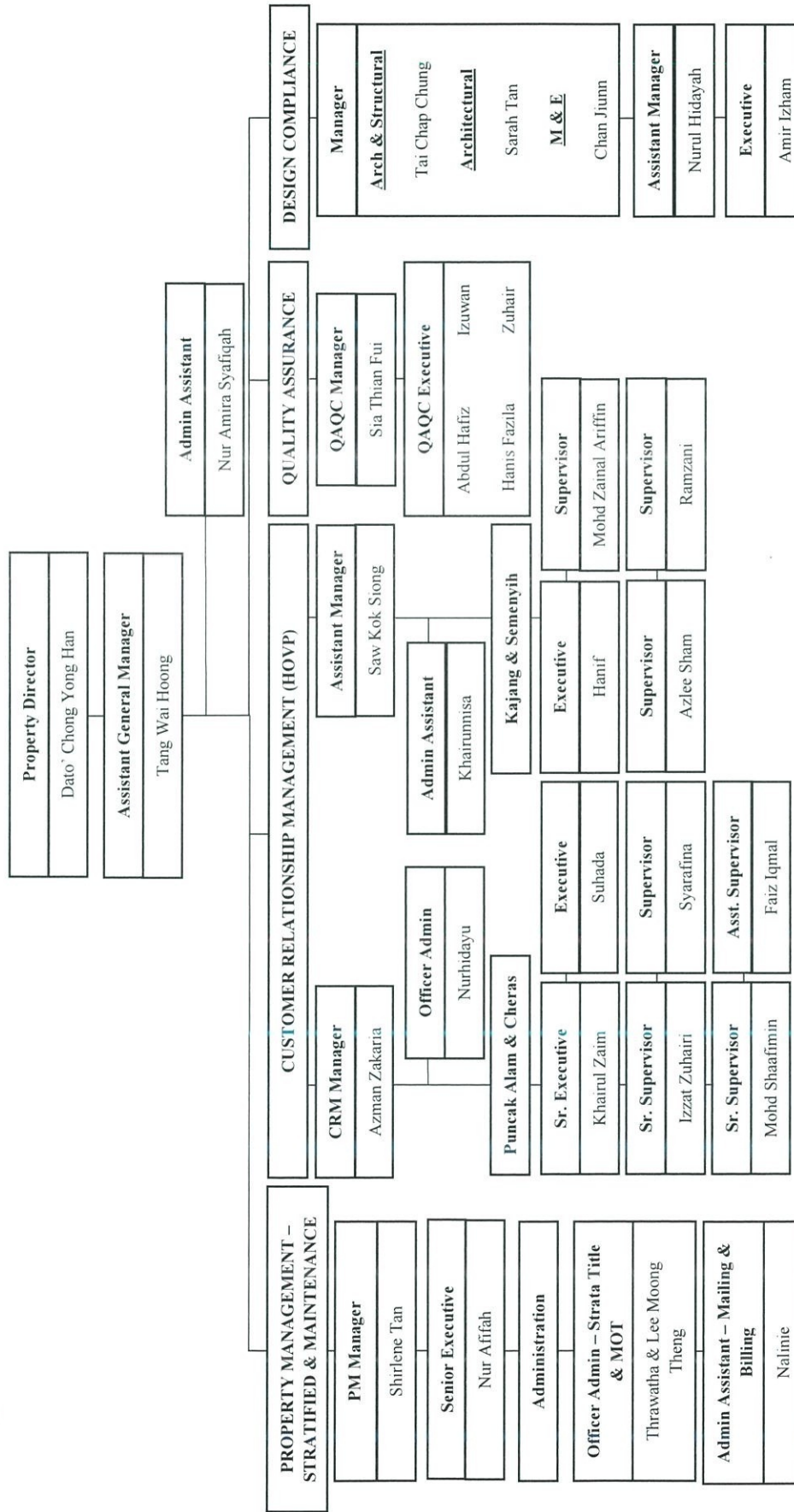


Figure 2.1 : Organization Chart, Department of Property, Strategic and Planning

2.4 List of Project

2.4.1 Completed Projects

Table 2.2 : List of Completed Project

| NO. | PROJECTS | CONTRACT VALUE | CLIENT | DATE OF COMMENCEMENT | DATE OF COMPLETION |
|------------|--|-----------------------|--------------------------|--------------------------------|--------------------------------|
| 1 | Proposed to Build 116 Units Terrace House, Precinct 3 along with 1 TNB Sub-Station Unit in Part of Lot 1996, Semenyih, Hulu Langat District, Selangor Darul Ehsan for Aliran Perkasa Sdn. Bhd. | RM 19,960,000.00 | Aliran Perkasa Sdn. Bhd. | 18 th February 2014 | 19 th May 2015 |
| 2 | Construction and Completion of Road, Drainage, Sewerage and Water Reticulation Works at Main Access Road From Precinct 1 Club House to Precinct 4 for Proposed Mix-Used Development on Lot 1990, 1996, 2530I and 25310 | RM 4,430,000.00 | Aliran Perkasa Sdn. Bhd. | 20 th April 2016 | 19 th December 2016 |

| | | | | | |
|---|---|---------------|----------------------------|-----------------------------|-------------------------------|
| | Semenyih, Hulu Langat District, Selangor Darul Ehsan (Kajang East) | | | | |
| 3 | Proposed Construction and Completion of Retaining Wall, Road, Drainage, Sewerage Works and Associated Works for Phase 2 For Proposed Residential Development on Lot 2118, 2119, 2120, 2121, 2122, 2217, 2230, 2231, 2822, 2823, 2824, PT 10952, PT 10953 And Part Of Government Land, Mukim Semenyih, Daerah Hulu Langat, Selangor Darul Ehsan (Hillpark 3-Phase 2) | RM 708,000.00 | Kajang Resources Sdn. Bhd. | 28 th March 2016 | 02 nd January 2017 |

2.4.2 On-Going Projects

Table 2.3 : List of On-Going Projects

| NO. | PROJECTS | CONTRACT VALUE | CLIENT | DATE OF COMMENCEMENT | DATE OF COMPLETION |
|-----|---|-------------------|--------------------------|--------------------------------|---------------------------|
| 1 | <p>Proposed to Build 329 Units of Terrace House and 28 Units of Detached House in Precinct 1, Kajang East Containing,</p> <p>Phase 2:</p> <ul style="list-style-type: none"> • 97 Units of 2-Storey Terrace House (22' X 70') • 38 Units of 2-Storey Terrace House (22' X 75') • 1 Units of Electric Substation <p>Phase 4:</p> <ul style="list-style-type: none"> • 86 Units of 2-Storey Terrace House | RM 46, 386,464.95 | Aliran Perkasa Sdn. Bhd. | 11 th February 2019 | 10 th May 2020 |

| | | | | | |
|---|--|-------------------|--------------------------|-------------------------------|----------------------------|
| | <p>(22' X 70')</p> <p>At Lot PT 37332, Semenyih, Hulu Langat District, Selangor Darul Ehsan</p> | | | | |
| 2 | <p>Proposed Mixed- Used Development</p> <p>Containing:</p> <p>4 blocks of 44 Level Service Apartment (640 Units), 2 Units Store, Residential Facilities which are swimming pool and parking on 7 Levels Of Podiums, Parking On The Ground which is at 1st Floor and 2nd Floor along with Mechanical Facilities and Guards On Lot 13753, (Kiara Road 4), Batu District, Kuala Lumpur, Federal Territory</p> | RM 168,932,871.52 | Aliran Perkasa Sdn. Bhd. | 18 th October 2018 | 17 th June 2021 |

| | | | | | |
|---|---|-------------------|--|---------------------------|------------------------------|
| 3 | <p>Proposed Development of 1 Block of 42 Level Serviced Apartment comprised of:</p> <ul style="list-style-type: none"> • 2 Storey Shop Lot (Level 1 and Level 2) • 5 Floor Podium Parking (Level 3 until Level 7) • 1 Level of Facilities Deck (Level 8) • 34 Level Apartment Serviced (Level 9 until Level 42) • 1 Level “Sky Lounge Deck” • 1 Waste Disposal House <p>Transit Oriented Development on Lot (Pt 86812 HS (D) 174628) Formerly Lot 8, Lot 10, Lot 21 and Government Land , Bukit Road, Kajang District, Hulu Langat District, Selangor Darul Ehsan</p> | RM 111,101,933.48 | Stand Allied Corporation Sdn. Bhd. (SAC) | 3 rd July 2019 | 2 nd January 2022 |
|---|---|-------------------|--|---------------------------|------------------------------|

CHAPTER 3.0

CASE STUDY

3.1 Introduction to Maintenance in Residential Building

MKH Boulevard was built on a 3.8 acre land which consists of boutique-shop office units and serviced apartments. The property was completed with facilities that give good environment to the users of the building which are gymnasium, playground, infinity swimming pool, barbecue area, reading room and multipurpose hall. This property is easily to access from any highway such as Sungai Besi Expressway, North-South Expressway, SILK Highway, Damansara-Puchong Highway and Kajang-Seremban Highway.

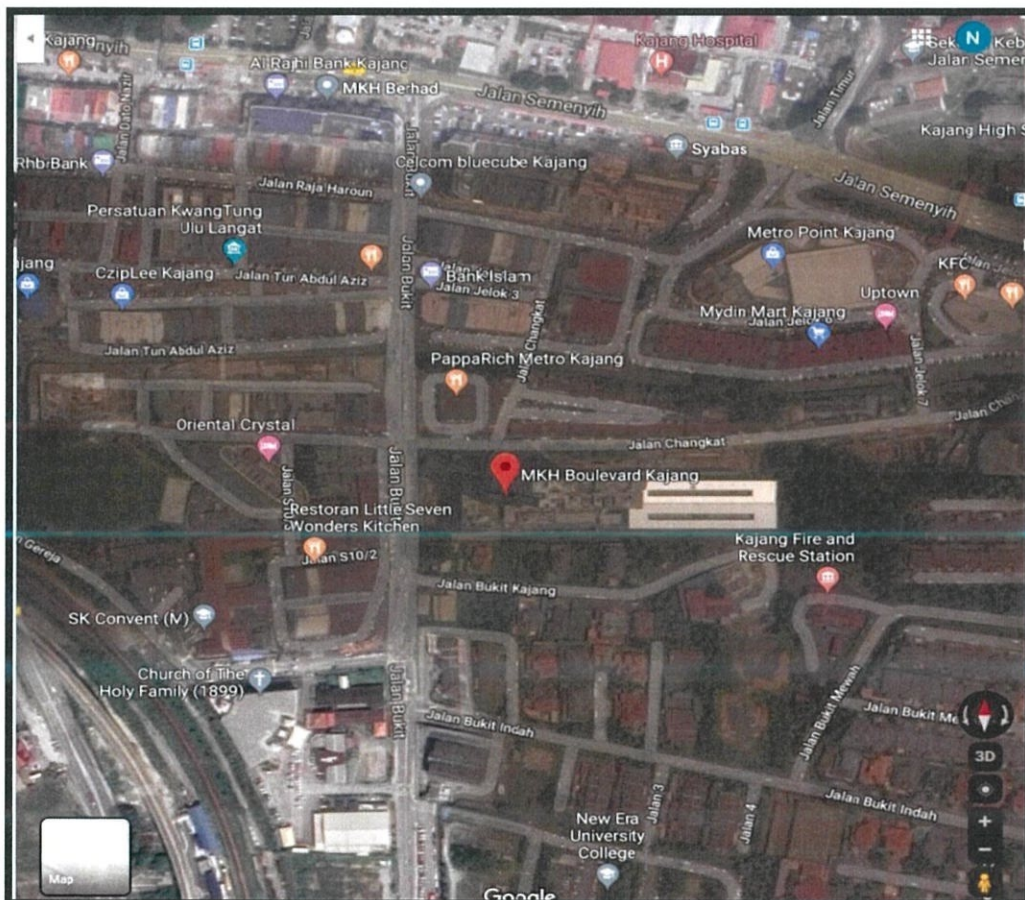


Figure 3.1: Location of MKH Boulevard

Located in the center of the city center of Kajang, MKH Boulevard is worth to be owned since it was a worthy property for self-occupancy and investment since it attracts many tenants who enjoy living in the central business district of Kajang. The education institutions that near the MKH Boulevard are New Era University College, Jalan Bukit Secondary School, Highschool Kajang, Real Kids Kajang Prima and the other institution which are located within a radius of five kilometers from the property. Some colleges and universities also 10 kilometers away from the property. Health facilities such as Hospital Kajang, Kajang Plaza Medical Centre are also near the property. The nearest shopping options such as Metro Kajang and Metro Point too are all located within four kilometers from the property. For those who come to shop at the property can catch a train from KTM Kajang or MRT Kajang stations, which is 600 meters away from the property.

The property was equipped by the facilities and it easier for the resident not to go anywhere to get those facilities since it was completed with a swimming pool, multipurpose hall, gymnasium, playground and the other things that may give the resident a benefit for staying there. The property also was completed with a barbeque area for outdoor cooking and roasting and a landscaped garden where you can take a stroll during leisure time.

All these facilities can be used for a long time if all of this thing could be maintained by the management team wisely and by following the maintenance schedule regularly. All the maintenance for this property had been carried out properly in order to maintain the value of the building while finding a solution for each problem while conducting the maintenance work.

3.2 Methods of Maintenance in Residential Buildings

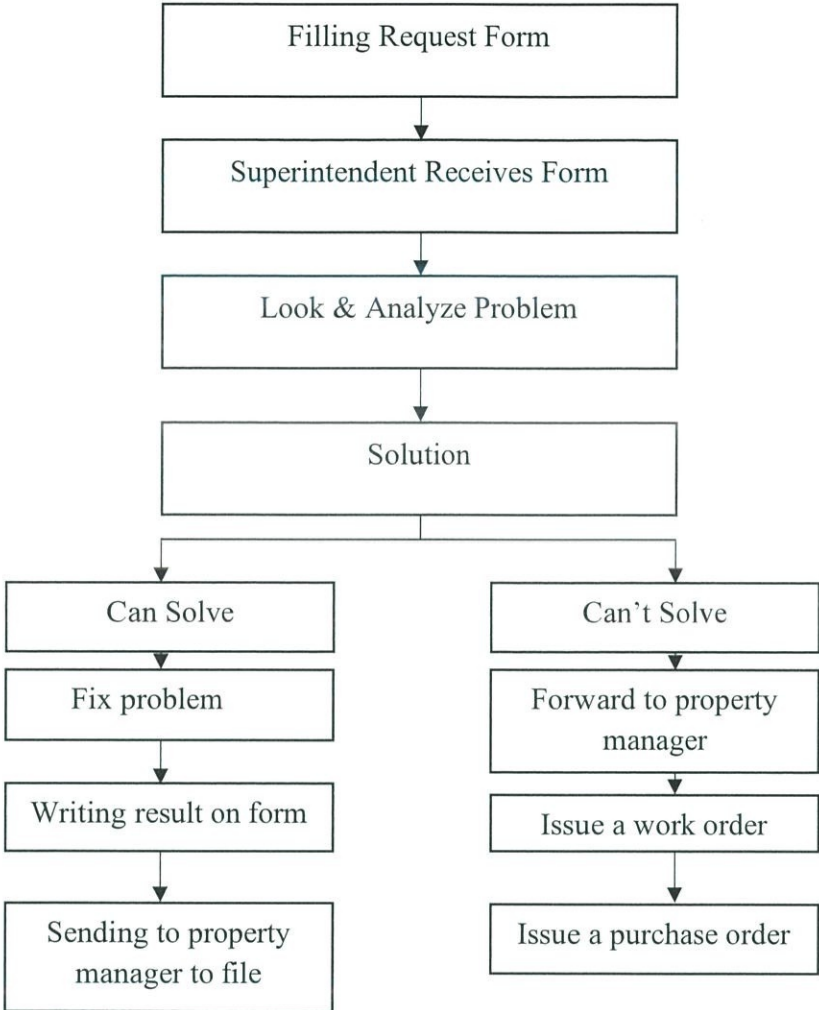


Figure 3.2 : Methods of Maintenance in Residential Buildings

i. Filling Request Form

When the maintenance need to be done, tenants and owners of the building need to inform the things that they needed to be settle down quickly to the management office. Filling the request form and put the at the corner of the form whether it was a general cases or heating cases.

SEREA SENTOSA SDN BHD (The Developer) &
PROPERTY MANAGEMENT COMPANY OF MKH BOULEVARD ("PMCO")
C/O HARTAMAS ASSET MANAGEMENT DN BHD

OWNER OR TENANT COMPLAINT FORM

REF NO: MKHBLVDHAMB01171

Name: FANG MING MING Tel No: 012-2529861
Unit No: A-23A-03 Date: 10/7/2017

Description of Complaints (To be completed by Complainant)

Request to waive water bill for Mei June
because of water pipe leaking badly
due to roof collapse result to
heavy loss of water on 1/5.

Signature: _____

FOR MANAGEMENT OFFICE USE ONLY

Require Immediate Action/Urgent
 Owner Responsibility
 Source for Contractor Quotation
 Other, Please Specify _____

Report by Management/Maintenance Staff

* this case under common area
must get approval by developer or JMC

Action by: Diana Date: 10/7/17
Checked by: _____ Date: _____

VERIFICATION BY OWNER AND TENANT

I, _____ satisfied and confirmed that the complaint work has been carried out with an impeccable and systematic.

Signature: _____ Date: _____

Figure 3.3 : Sample of request form from the owners

General case means the problem regarding facilities, amenities, unit house problem such as lighting or anything else. Most of the general cases can be solved immediately.

For the heating cases, it involved with the heating system which is boiler pressure, boiler supply temperature, boiler return temperature, building supply water temperature, boiler return temperature, and outdoor temperature.



Figure 3.4 : One of the facilities at MKH Boulevard

For the problem that required to be done immediately and may cause damage to the other unit, urgently report to management office to make sure management office can inform to maintenance team on time and can be settle down immediately without need and authorization from the property management. For the common maintenance, it need to be done based on the monthly schedule. That's why, here there are some types of maintenance which are routine maintenance, preventive maintenance and remedial maintenance.

Routine maintenance usually involving of the things that need to be keep it functional and protect it against early decay. It is because each part of the building are made in the different location with a different quantity of material. So, it have a different duration of ageing.

Preventive maintenance involving things that need to be improve to makes it more durable and functional. Other than that, it automatically can make the building structure more strong and resisting early damage.

Next, remedial maintenance. This maintenance is removing any damaged part or removal any defect. Action need to be taken urgently because if let the problem become more serious, it will affect the structure of the buildings itself and causing further damage.

ii. Superintendent Receives Form

After owners or tenants had filled their request for maintenance or maintenance problem, superintendent will receives the form. A maintenance superintendent is responsible to the management of the building, budgeting the costs of maintenance and make sure all the operations run well. Superintendent also need to keep the building in a good condition by examining the condition of building regularly whether it should to be repairs, maintenance or clean. They also have to supervise maintenance staffs, outside contractors and maintenance of upkeep and landscape. The most important thing is all general building maintenance need to be supervise by superintendent to keep up the performance of the building.

iii. Look and Analyze Problem

Then, superintendent looked and analyzed the complaints form whether in need to be classified on which category. The category will be categorized into three stages which is known as levels of urgency.

First level is serviced required. Serviced required means that the maintenance was classified as the least urgent jobs which means if the work maintenance will be delay about two or three days, it won't affect the building or the other units of the building. Moreover, it will not affect the amount of the complaints that will be receive from the other unit.

Second level is urgent. This means that the job required to be done as soon as possible because the problem may affect the other unit. For example, for the leaking problem. It may affect the other unit and cause a damage on the wall of the other unit.

The third levels was classified as emergency. This means that this type of case needs to be done super immediately since it involving the safety and the structure of building itself. Example case that need to be classified as emergency is the light tripping in the circuit breaker. It need to be done super immediately because it may risk the safety of the building user.

iv. Solution

Solution will be classified into two category which is one that can be solve and another one, can't be solve.

MRE/MT/01.00 20080917

ELEVATOR MAINTENANCE REPORT
ELV ROP NO.: **100930**

ARAH ENGINEERING SDN. BHD.
Lot 4, Jalan 4, Kuala Lumpur Park,
62010 Kuala Lumpur
Tel: 03-91782222

DATE: **29.8.2019**

WORKING NAME: **TRIP BOULEVARD** UNIT CODE: **106/100930 B2/C**

LOCATION: **51 B2 C 10**

| DESCRIPTION | LIFT NO. | 51 | B2 | C | 10 |
|-----------------------|----------|----|----|---|----|
| Operating Condition | | | | | |
| Performance Condition | | | | | |
| Control Panel | | | | | |
| Motor, Traction M/C | | | | | |
| Brake System | | | | | |
| Controller | | | | | |
| Door | | | | | |
| Door Operator | | | | | |
| Door Fan | | | | | |
| Lighting | | | | | |
| Clear Condition | | | | | |
| Car | | | | | |
| Car Top Condition | | | | | |
| Car Bottom | | | | | |
| Car Door | | | | | |
| Car Door Mechanism | | | | | |
| Car Safety | | | | | |
| Car Floor | | | | | |
| Car Wall | | | | | |
| Car Ceiling | | | | | |
| Car Ventilation | | | | | |
| Car Lighting | | | | | |
| Car Sound | | | | | |
| Car Temperature | | | | | |
| Car Humidity | | | | | |
| Car Air Quality | | | | | |
| Car Noise | | | | | |
| Car Vibration | | | | | |
| Car Odor | | | | | |
| Car Cleanliness | | | | | |
| Car Safety | | | | | |
| Car Emergency | | | | | |
| Car Communication | | | | | |
| Car Information | | | | | |
| Car Entertainment | | | | | |
| Car Security | | | | | |
| Car Maintenance | | | | | |
| Car Inspection | | | | | |
| Car Repair | | | | | |
| Car Replacement | | | | | |
| Car Disposal | | | | | |
| Car Recycling | | | | | |
| Car Energy | | | | | |
| Car Sustainability | | | | | |
| Car Innovation | | | | | |
| Car Research | | | | | |
| Car Development | | | | | |
| Car Testing | | | | | |
| Car Certification | | | | | |
| Car Compliance | | | | | |
| Car Standards | | | | | |
| Car Regulations | | | | | |
| Car Laws | | | | | |
| Car Policies | | | | | |
| Car Procedures | | | | | |
| Car Protocols | | | | | |
| Car Guidelines | | | | | |
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| Car Audio | | | | | |
| Car Visuals | | | | | |
| Car Tactile | | | | | |
| Car Olfactory | | | | | |
| Car Gustatory | | | | | |
| Car Auditory | | | | | |
| Car Kinesthetic | | | | | |
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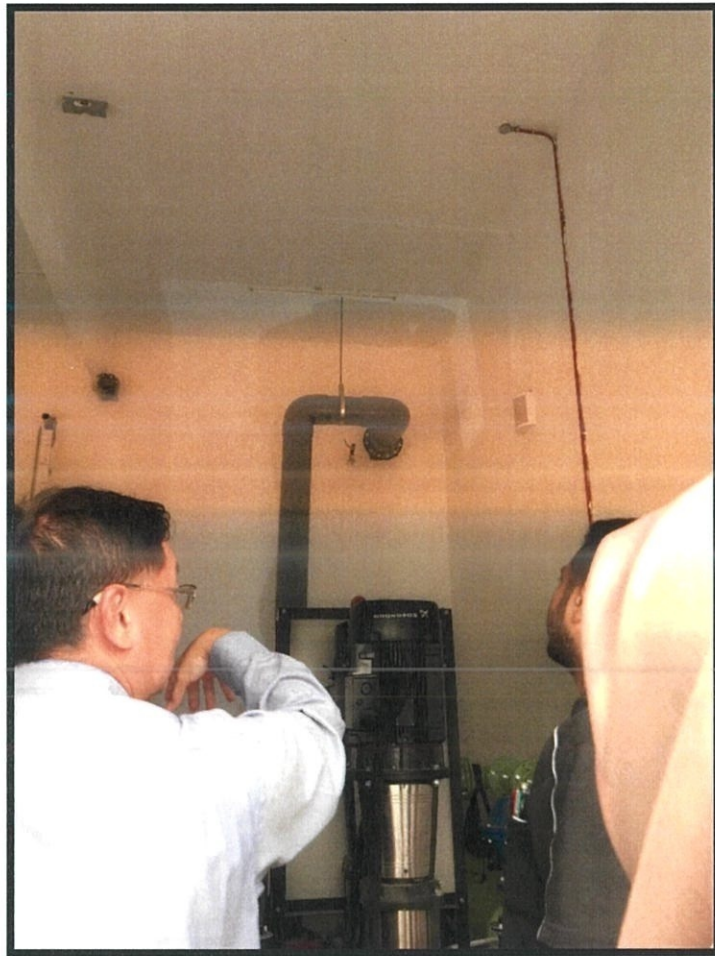


Figure 3.6 : Superintendent assisting contractor to check the problem at pump room

Then, the superintendent will assist the outside contractor or maintenance team to do maintenance or repair the problem. After the problem fixed, contractor or maintenance team writes the results on the form whether it required maintenance regularly or it need to be inspect and observe often maybe after weeks or two weeks of maintenance. Then, the report or results will be sent to property manager to the next process or to file in one document for future references.

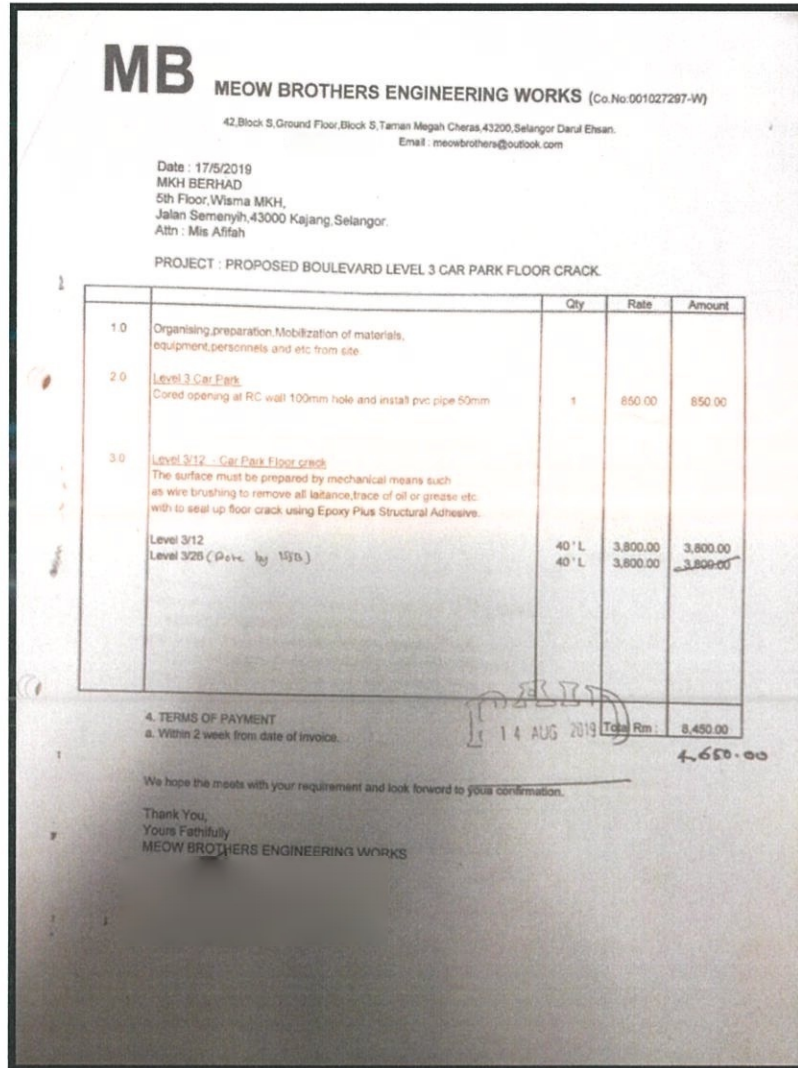


Figure 3.7 : Sample of proposal to repair the floor crack at parking garage

Second, for cannot be solved problem. Usually, cannot be solved problem need to be inspected by the specialist. The form that been written by the user or tenants will be forward to the property manager. Property manager will find someone that could be more practiced in that field such an engineer. Then, the property manager will issue a proposal to repair the work the contractor and ask for quotation. After the problem fixed, payment memo will be issue to pay the cost of the maintenance and repair work.

During maintenance work, tenants and owners will be updated by superintendent the progress of the work. It can be by email, phone or notice and memo to the owners and tenants. The advantage of doing this kind of action will prevent undelaying complaints coming more and it can reduce the number of complaints. If the maintenance works could affect the other user, the maintenance team should to notify the tenants and owners by putting the memo.

For the emergency request, the superintendent will contact the property manager or contact the contractor without asking the quotes. After the contractor doing the repair work, then the property manager will request a payment memo to the account. If the contractor or the property manager cannot be reached, the superintendent and management officer has the authorized to do maintenance and repair work by their own responsibilities.

3.3 Common Preventive Maintenance

a) Parking Garage



Figure 3.8 : Parking garage at Level 7, MKH Boulevard

Parking garage is one of the most important area that must to be inspect and maintain regularly. Parking will be more functional if the parking be more conventional and clean all the time without had a dust in it.

To prevent the parking from faced a problem like deterioration in concrete parking, there are several ways to maintain this area. The garage floor drains cleaned and inspected on a regular basis. Then, floor surfaces washed regularly because the floor kept dirty. Other than that, for the basement parking, always to making sure the garage is well ventilated and once a year, qualified professional will inspected the area.

b) Electrical Switchgear



Figure 3.9 : Electric switchgear at HT Switch Room 1, MKH Boulevard

Electrical switchgear is a circuit protection devices that function to control and protect the circuit breakers, fuses and switches. This device are made from metal structures. Switchgear commonly found in throughout electric utility transmission and distribution systems.

Common problem that happens in electrical switchgear is overheating because it can lead to power outages or a fire. There are several maintenance to be inspect regularly to prevent all the problem related to it. First, electrician inspected and checked carefully while tighten the connecting fasteners in all switchgear at least once a year. Second, all non-metal surfaces will be wiped and cleaned to make sure it free of dust while the mechanical part lubricated after each cleaning. Lastly, the circuit breaker switch had to be inspected on and off on a regular basis.

c) Swimming pools



Figure 3.10 : Swimming pool at Level 6, MKH Boulevard

Swimming pools is a facility that had to be maintain properly because this structured designed to hold water and to enable the owners and tenants to swimming on a leisure time.

There are several ways to make sure the swimming pools is well maintained. First, the pool will be clean at least three times a week to prevent algae growth and it will cause the pool musky and green. Then, qualified contractor chemically treat the water two times a week to make sure there is no too much chlorine or something else that may irritated the skin. Then, making sure the lighting, ventilating and filtration are regularly maintained. Lastly, the safety equipment such a life rings, hooks, ground fault detector for underwater lights, a phone and first aid kit will be checked to make sure all the things are enough.

d) Backflow preventers



Figure 3.11 : Backflow preventer

Backflow preventer commonly allows water to flow in one direction. Other than that, it prevent the users from using non-portable water. So, it used to protect potable water and stopping the non-potable water from backing up the supply line.

So, to make sure it never flow in opposite direction, there are several ways to keep backflow preventers from contamination and pollution. First, backflow preventer must to installed, inspected and maintained by qualified contractor. To test the preventer, certified backflow prevention device tester had been used whenever cleaned or repaired process was happened. Lastly, all backflow preventer had been checked once a year or twice a year with certified backflow prevention device tester.

e) Envelope deterioration



Figure 3.12 : Exterior walls with landscape outside the building

Building envelope is a physical barrier that separate between the exterior and interior environments. Building envelope is constructing on three elements which are climate appropriate, structurally sound and aesthetically pleasing. Building envelopes include of exterior walls, foundations, roof, window and door.

The common problem regarding building envelope is moisture problems. So, it better to cure the problem early because it can be obvious damage to the building. Some steps to be done to prevent the other major problems of building envelope problem. First, exterior buildings will be inspected at least twice a year to make sure no serious damage happened. Secondly, qualified contractor had inspected and take care any problem that occur on current time. Lastly, put a notice and announced to the owners if any leaks or damage happened, kindly to inform early and report to management office. It can be fix immediately before it turns to be serious problem.

3.4 Common Corrective Maintenance

a) Apartment window cleaning



Figure 3.13 : Dirty glass window at Level 7 of MKH Boulevard

Common maintenance scenario that usually happened in high-rise residential building is apartment cleaning. Cleaning the apartment classified under housekeeping category. Housekeeping is involving of clean the apartment window, pay the bills and maintenance at all place. For the aspect of the developer side, these tasks usually performed by the property management team which are required to allocated the money for such use.

In term of clean the apartment is clean the window by washing the window using the brittle wash. Usually the window that need to be clean and maintain its aesthetic value is window that located at facilities room such a gymnasium.

Wiping the glass window is a risky things to be done and moreover, it have to be done on a high rise building. Since the window is hard-to-reach window, it had to be

cleaned professional quality squeegee. Scrubbing the frame using bristle brush, rinse with outdoor hose and insert back into window to dry.

b) Water leakage into basement



Figure 3.14 : Water leakage into basement

Water leakage into basement also one of the common problem that must to be faced by most of the owners in the high-rise residential building. Water is condensing and it's worried if it will damage the concrete. In addition, moisture in basement can cause mold and mildew and ruin wall materials. The leak has been carefully investigated and the source does not discovered because it required assessment from mechanical engineer.

Some of the solution that can prevent the basement from leak are waterproof the walls. When the rough inspection had been done, installing an interior drainage system can get the water out but it doesn't mean that the leakage can't be happened again. Another solution is add drainage features such a sump pump. Sump is usually constructed pit, usually a hole carved below the main surface of basement floor. This pit will hold the sump pump. It is equipped with valves that sense escalating water levels and pressure. When it get to detect the water gets too high, sump pumps

quickly pump excess water out of the basement using a discharge line which is connect the sump pump to a designated drainage area.

c) Plant disease, insects and pests



Figure 3.15 : Landscape at the entrance of MKH Boulevard

For the landscape area, most of the thing that had to dealing with is plant disease, insects and pests. Disease are infesting grounds and plants. Maintenance team that in charge in landscape is required to inspect the cause and find some solution that could prevent major damage. Pests control is a must since the pests will damage the crops by feeding activities and disease involving microorganism such as fungi and bacteria. Example of pests are rats, nettle caterpillars and termite. The pests must be control because it will disrupting the plant physiology and the most irritating is metabolism or direct cellular and tissue will damage.

Common pests that infected the plant is wireworms. If wireworms feed on the roots of the plants, the growth of the plant itself will slow and will be weak. They are extremely hard to control and there are several ways to do when the wireworms are present in order try to limit their destructiveness. First, remove and destroy infected crops after harvesting and cultivate the soil to expose the soil to birds. Last one, gray mold. Gray mold frequently affects peony plants. Some solution to be done to prevent this matter happened again is remove and destroy any affected leaves. Clean

between plants to make sure the disease cannot infect the other plants. So, groundskeeping must to be done regularly to prevent the disease between plant happened.

CHAPTER 4.0

CONCLUSION

4.1 Conclusion

Nowadays, a lot of prestigious buildings can maintain the value of their buildings because they keep maintained their buildings regularly and keep track of their maintenance issues that occurred them. By maintaining the building regularly, not only can maintain the value but it will give the user of the building can use the building for a long time and give a good environment to all people.

There were a lot of things can be gained from the maintenance of the building. To maintain the building or the problem that will obtain from the user, have a certain step to make sure it will go through step by step to make sure the maintenance progress goes well. So, the contractor itself can do the job properly based on the urgent maintenance until the least urgent maintenance. There was common maintenance that usually does in the buildings and this basic maintenance must maintain because it will involve all the people that use the building. The maintenance scenarios that usually occurred in the building have each solution that immediately took action by the contractor.

In conclusion, all these maintenances in this building give a lot of new knowledge and advanced experience for a practical student before move forward into a real work environment.

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