



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

**BUILDING DEFECT MANAGEMENT : A CASE STUDY AT THE
HAVRE BUKIT JALIL**

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DECEMBER 2018

STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Kenwingston for duration of 14 weeks starting from 3 September 2018 and ended on 7 December 2018. It is submitted as one of the prerequisite requirements of DBG307 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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DECEMBER 2018

It is recommended that the report of this practical training provided

by

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entitled

**HIGH-RISE BUILDING UNIT DEFECTS MANGEMENT PHASE 2A, THE HAVRE
BUKIT JALIL**

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

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Last but not least, my special thanks to my beloved parents for sacrificing time and money during my internship. Not to forget my brothers in arms for helping me to go through during tough time at Kenwingston.

Thank you so much.

ABSTRACT

To perform rational defect prevention, it is necessary to have knowledge about defects, their causes and associated costs. Defect is a very important factor to be taken seriously, therefore this report will discuss about defects management and how to solve it in a house unit. This report was conducted to investigate the High-rise building Unit defects for PHASE 2A, THE HAVRE BUKIT JALIL. The objective of this report is to identify the high-rise building unit defects by executing detailed inspections on all 15 units of houses at each floor. It will focus on identifying defects that clients did not aware of. To identify the method of rectification for the defects after it has been identified by using the right material and the appropriate time. This report will also look at the execution of rectifying the defects by choosing the right person to execute the works and thus by following these objectives it could minimise the amount of the defects that existed in the house unit in the future.

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CHAPTER 1.0

INTRODUCTION

Building Defects ; According to Webster's Dictionary, defect is defined as lack of something necessary for completeness; shortcoming. It is also defined as an imperfection; fault; blemish. Defects are building flaws from my observation. It occurs because of human errors mostly. Such as, leaking of water from ceilings, hollow tiles, dysfunctional of window, dysfunctional of door, were an embarrassment and needs to be taken seriously. 'If this situation is left unanswered and untreated, it will lead to more serious problems in the future upcoming construction projects in Malaysia' (Ahzahar, Karim, Hassan & Eman, 2011). Furthermore, if these problems continue most construction companies in Malaysia would be facing a downfall. This is because, 'Nowadays client are getting more intellectual in identifying defects whenever they wanted to buy a house' as said by Mr. Steven the Senior Project Manager of Kenwingston. If defects are present at a high percentage in a house unit, they certainly would tell the world about it. Especially High-rise building units which were located at the urban areas that costs more than RM500k. If the house has that price tag, defects should be minimise to only 10%. As we all know the word 'Viral', which could spread the bad news to the community in a flash. This would blemish the companies reputation from being awarded with a construction project. This problem serves my aim which is to investigate the High-rise building unit defects for PHASE 2A, THE HAVRE BUKIT JALIL.

1.1 Scope of study

The study carried out at THE HAVRE , Lot 15252 16/155c Lebuhraya Bukit Jalil, 57000 Federal Territory of Kuala Lumpur. My scope of study is focus on defects management. Defects management is where we identify the type of defect, finding the right solution for the defect and implement it in a right manner at a certain period of time given. The total of manpowers involve is 40 General workers or on site we called them Kongsikong(KSK). It was my duty to manage and supervise all 40 Kong Si Kong (KSK) for both defects and progress works. The amount of labours on site are 2160.

1.1.1 To identify the building defects

I was educate by my Supervisor Mr. Koo, on how to determine or spot a defect at PHASE 2A THE HAVRE LVL 21-30. 'In order to determine a defect, firstly we must know what the defects are' as said by him. The example of type of defects are, improper skim coating, uneven coats of paint, tiles cracking, chipping, improper size of skirting, dysfunctional of switches, doors, windows, etc. There are not many materials used to identify the defects. Which are, level, measuring tape, ball bearing, flashlight and the most important thing is a pair of good eyes. Machineries does not involve in spotting a house unit defect. Otherwise it is for external wall defects. Such as, wall cracks, wall damage during the dismantling of scaffolding, a gondola is required then.

1.1.2 To identify the method of rectification works for building defects

Finding the right method of rectifying the defects are important. This is because, a minor changes of methods could cause a disaster. For instants, there were specific type of cement use for wall tiles installation. If the cement is different, it could cause the tile to fell of the wall and damage itself. Both time and money are wasted. In my opinion, the more experience you are in the field the better you are on finding the solution. You will sharpen your observation skills in time.

1.1.3 To execute the rectification works for building defects

Rectification means, after the solution have been identified the rectification works could be assigned to the person in charge for each type of defects.

1.2 Objectives

In order to investigate the High-rise building unit defects, we firstly have ;

- I. To identify the building defect.
- II. To identify the method of rectification works for building defect.
- III. To execute the rectification works for building defects.

1.3 Research methods

During my practical training at Kenwinston, there were 3 research methods that I have did, which are ;

I. Observation

I have observed the method of works showed by the staffs on how they execute their task. The deadlines are tight, thus pressure is at high level at all times. This makes the staffs specifically my supervisor Mr. Koo Loong Siang became aggressive on pushing the sub-contractors to do their works within the deadline. From the regular inspections that I did at the typical floor, I've use my sense of observation to learn on how to identify a defect in the unit houses. Besides that, method of solution of a certain defect is also observed. Such as, the solution for tile defects , skim coating defects, door frames defect and etc. Next, the type of finishes, materials use is also observed by me on site. I record them by writing down small notes, taking pictures and videos for a better understanding of it.

II. Interviews

For interview method, I have used both unstructured-interviews and semi-structured interviews. Unstructured-interviews always constructed during sitewalk with supervisors, project managers, directors. Besides that, during the execution of my task unstructured-interview were always conducted to the workers. This is because, "the workers are professional, we are here only to supervise their works" as said by my supervisor. The labours were more experience about their works. Thus, a few whys was asked to them for me to gain knowledge practically. Semi-structure interviews did not conducted often, due to my limited amount of time spent in the site office. But, a few questions were asked at the site office where the questions were prepared beforehand. I ask the site supervisor about defect works, the director about structure works. Everything's were recorded by hand because of the limited time I have.

III. Document reviews

I have refer to construction drawings to have a better understanding on the landmark. Company profile where I obtained the organisation chart, progress report, pictures and forms such as Request Form Inspection to learn more about defect.

Chapter 2.0

COMPANY BACKGROUND

From an interview with Mr. Koo, he stated that Kenwingston was established on the year 2010. It all started from PC Construction, where the Managing Director Dato' Lam Kong Tang and fellow Project Directors, Mr. Lew Kok Sin, Mr. Yeoh Boonlim, Mr. Ryan Tang Seng Wai worked as the project manager and site supervisors respectively. They work for a quite some time at PC Construction until one day they decided to resign due to payment problems and came up with an idea to build up a company called Kenwingston. At the beginning of the stages, Kenwingston started as main contractors to build up their reputation across the nation. 'Dato' Lam and Mr. Lew once drove a 'Kancil' only' as said by Mr. Kamal the architect supervisor who is in charge for the facilities floor at LVL 6. Throughout the years, the Board of Directors (B.O.D) manage to shine their reputation by using their perks which are being able to built structure works rapidly by maintaining the quality of workmanship.

The year, 2018, marks the new them, Kenwingston is now a property developer. Construction, which used to be our main area of business, now ably supports our property development activity. Kenwingston decided to be a property developer fully in 2019. 'THE HAVRE and JALIL EMAS was the last construction project that they assigned as main contractors' as said by Mr. Koo site supervisor. Nevertheless, their experience in the industry also gave them the confidence to become a property developer.

Last but not least, In my opinion Kenwingston would become successful in being a property developer as they are driven by a passion for innovation and embrace harmony between human habitation and nature in our projects through architecture to improve the quality of life and liveability.

2.1 Company Profile



Figure 2.1 : Certificate of Quality Assessment System in Construction(QLASSIC)

Source : Courtesy of Kenwingston news and highlights 2018

Kenwingston is a Construction Industry Development Board (CIDB) Malaysia 80% scorer based on the Quality Assessment System in Construction (QLASSIC). Such a track record is exceptional in the country's construction industry.

Besides that, they also received the Best (Qlassic) Achievement Awards of Excellence in 2018 which were presented by Construction Industry Development Board (CIDB).

Back in July 2010, the company had a paid-up capital of RM16 million. As of 31 December 2016, the total value of the completed projects stood at multi-billion ringgit comprising high-rise buildings, high-end shop offices and superlink houses.

<https://www.kenwingston.com/news-and-highlights>

2.2 Organization Chart

The chart(pg11) shows the positions at THE HAVRE Bukit Jalil. It also determine the person in charge in each of the departments. There were 4 departments in total, which are contract/purchasing store department led by Mr. Lee Whye Seng, SR.Contract Manager. Next is Structural/Architectural led by Mr. Khairuddin, Project Manager for PHASE 2 THE HAVRE and Mr. Steven Chong, Project Manager for PHASE 1 JALIL EMAS. Then, Mechanical & Electrical(M&E) department led by Mr. Najmi. Last but not least, the Safety, Health & Environment Department led by Mr. Gajendran Safety, Health Management Officer.

Whilst, figure 2.2(pg12) shows the Board of Directors of Kenwingston led by Dato' Lovis Lam Kong Tang, followed by the fellow directors which are Lew Kok Sin and Ryan Tang Seng Wai who were involved in this project.

THE HAVRE BUKIT JALIL PROJECT

ORGANISATION CHART

THE HARVE BUKIT JALIL PROJECT

CADANGAN PEMBANGUNAN 283 UNIT PANGSAPURI YANG MENGANDUNGI :

1. PASA 1 : 2 BLOK PANGSAPURI MAMPU MILIK (1859 UNIT) YANG TERDIRI DARIPADA

a) BLOK A : 39 TINGKAT (525 UNIT) b) BLOK B : 39 TINGKAT (525 UNIT)

TERMASUK 8 TINGKAT PODIUM TEMPAT LETAK KERETA BERSERTA KEMUDAHAN PENDUDUK, PENCAWANG ELEKTRIK, KERUK SAMPAH DAN PONDOK PENGAWAL

2. PASA 2 : 2 BLOK PANGSAPURI (2432 UNIT) YANG TERDIRI DARIPADA :

a) BLOK A : 14 TINGKAT (598 UNIT) b) BLOK B : 34 TINGKAT (563 UNIT) c) 6 TINGKAT PODIUM TEMPAT LETAK KERETA

d) 3 TINGKAT ARAS BAWAH TANAH TEMPAT LETAK KERETA e) 1 TINGKAT KEMUDAHAN PENDUDUK DI TINGKAT 7 (COLAM RENANG)

f) 1 TINGKAT REKREASI DI TINGKAT 41 "SKY GARDEN" DEWAN SERBAGUNA & BILIK PERMAINAN TERMASUK PENCAWANG ELEKTRIK, KERUK SAMPAH DAN PONDOK PENGAWAL

DI ATAS LOT PT 15252, SELUAS 6.847 EKAR, LEBUHRAYA BUKIT JALIL, RUKIT JALIL, MUKIM PETALING, DAERAH KUALA LUMPUR WILAYAH PERSEKUTUAN KUALA LUMPUR

UNTUK TETUAN SENERJUTA SDN BHD

ORGANISATION CHART

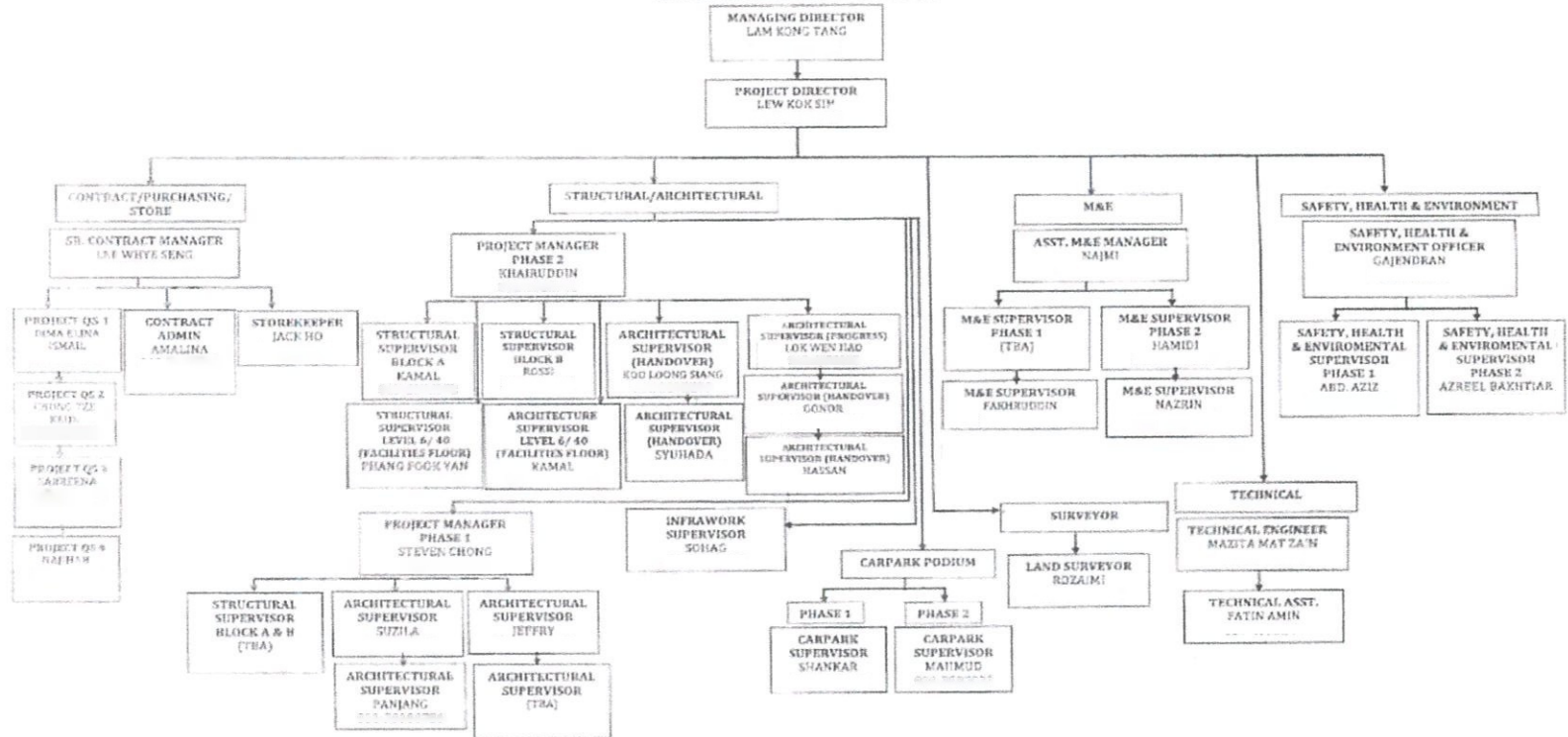


Table 2.1 : Organisation Chart

Source : Kenwingston's Company Profile
2017.pg 168.



Figure 2.2 : Kenwingston Board of Directors.

Source : Courtesy of Kenwingston.

Table 2.1 : Name of the directors that involved at THE HAVRE.

Source : Company Profile of Kenwingston

Name	Position	Primary Company
Lovis Lam Kong Tang	Managing Director	Kenwingston Sdn Bhd.
Yeoh Boonlim	Director	Kenwingston Sdn Bhd.
Ryan Tang Seng Wai	Director	Kenwingston Sdn Bhd.
Lew Kok Sin	Director	Kenwingston Sdn Bhd.
Lim Kim Eng	Director	Kenwingston Sdn Bhd.

2.3 List of Projects

Table 2.2 : Completed projects of Kenwingston.

Source : Kenwingston website/construction division.

PROJECTS	TYPE	LOCATION	COST
<i>Completed</i>			
<p>The Parkhill Residence</p> 	Condominium Tenure	Bukit Jalil, Kuala Lumpur	RM45,000,000
<p>De Centrum</p> 	Soho	Sepang, Selangor	RM150,000,000
<p>Almyra Residence</p> 	Mix Development	Bangi, Selangor	RM55,000,000
<p>Seasons Garden Residence</p> 	Serviced Apartment	Wangsa Maju, Kuala Lumpur	RM68,000,000
<p>Conexion</p> 	Apartment	Sepang, Selangor	RM71,000,000

Table 2.3 : Ongoing projects of Kenwingston.
 Source : Kenwingston website/construction division.

PROJECTS	TYPES	LOCATION	COST
<i>On going</i>			
Kenwingston Square Garden 	Mixed Development	Cyber 9, Cyberjaya	RM500,000,000
Kenwingston Avenue 	Serviced Apartment	Sungai Besi, Kuala Lumpur	RM300,000,000
The Societe 	Mixed Development	Sri Hartamas, Kuala Lumpur	RM150,000,000
The Havre 	Luxury Condominium	Bukit Jalil, Kuala Lumpur	RM96,000,000

Chapter 3.0

3.1 Introduction to Case Study



Figure 3.1 : THE HAVRE and JALIL EMAS under construction

Source : Courtesy of Kenwingston , captured on site, 5th of September 2018

THE HAVRE, a mythical living as its concept. Havre means Haven in French, which led to the landscape that comprises both urban and nature factor. It was inspired by its prime location. THE HAVRE consist of 2-block condominium that melds mythical Greek and Babylonian elements with extraordinary architectural form. With the use of timber ,marbles as its finishes, the green flourish environment serves the mythical Greek and Babylonian elements in design. The 2-block were not similar in design. During my practical training I was assigned to be in charge at block A. The Block A is flat straight in design. On the other hand, the Block B corridor layout is 'Z' in shape. The A block was equipped with 15 units of houses whilst, 16 units for Block B. There are two types of units for both blocks which are type 'A' and type 'B' as shown from figure 3.2 and figure 3.3.



Figure 3.2 : THE HAVRE type 'A' unit floor plan

Source : Aset Kayamas website



Figure 3.3 : THE HAVRE type 'B' unit floor plan

Source : Aset Kayamas website

Furthermore, the project value is cost RM96,000,000 million in total. Which is a tremendous figure. Same goes to Kenwingstons other projects. Such as, Kenwingston Square Garden reaches an astonishing RM500,000,000 million for the project. THE HAVRE offers a 5 star features facilities with a unique touch of nature nurtured into the architectural design of the facility area. The facility areas are located at LVL 6 Podium and LVL 40 Skygarden. Due to the tremendous amount of facilities the price tag for each houses is range from RM600,000- RM800,000 which is reasonable because of the procedures of inspection of defects, the quality of material used, top notch facilities and etc, are the perks for HAVRE to have such high value of houses.

Next, during a meeting at HAVRE the target of completion date is revealed, which is on the 31st of January 2019. Including, the 'handover' to the clients that bought the house. This project started on April 2017 and manage to finish up their structural works on august 2018. It only took a year and a half for the team to complete the concreting works from the column stump, up until the rooftop area which is LVL 40.

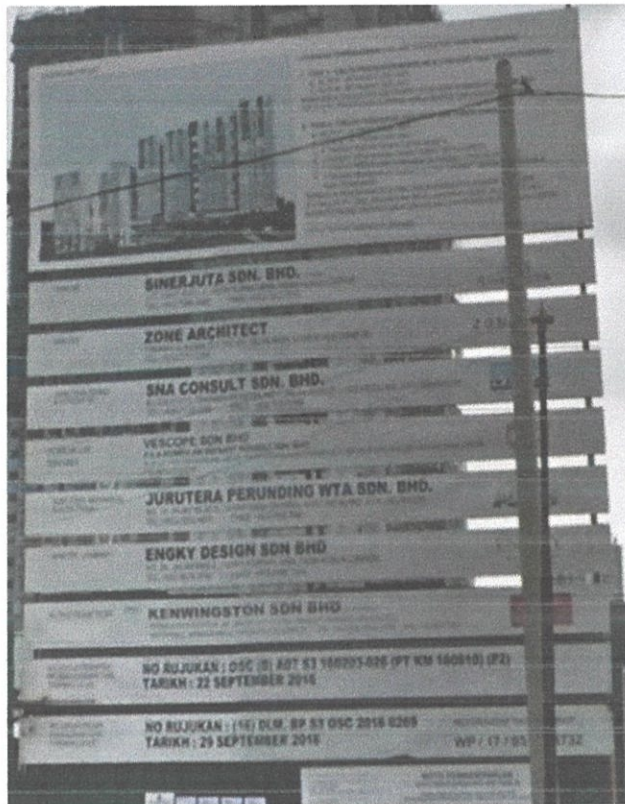


Figure 3.4 : Construction Project Signboard

Source : Google images

The board shows the parties involved at THE HAVRE. The developer is Aset Kayamas who awarded Kenwingston with the project as the main contractor. Zone architect is the architect who design the building layout for both THE HAVRE and JALIL EMAS. Kenwingston did not involve in substructure works. The company only did superstructure works which started from the column stump up to the roof level.



Figure 3.5 : The location plan of THE HAVRE

Source : Aset Kayamas Website

THE HAVRE is located near the Bukit Jalil Highway and the Shah Alam Highway which is convenient for workers, and is just a light 600m away from the Muhibbah LRT station. It is a must to have LRT station nearby to our residence nowadays. That is why THE HAVRE offers a covered walkway for residents that connects to the nearest LRT station which is Muhibbah as shown on the figure above. The National Stadium is within a gentle arm's reach from THE HAVRE. THE HAVRE is also only 13 clicks away from Kuala Lumpur City Center. It was located at a residential area. Such as, semi-d, bungalow, terrace houses surrounded THE HAVRE in a 500m radius. The condominium is strategically placed, in terms of access and egress from highways, landscape where less noise pollution is produced, and a breathtaking KL city view alongside the National Stadium could be enjoyed at home.

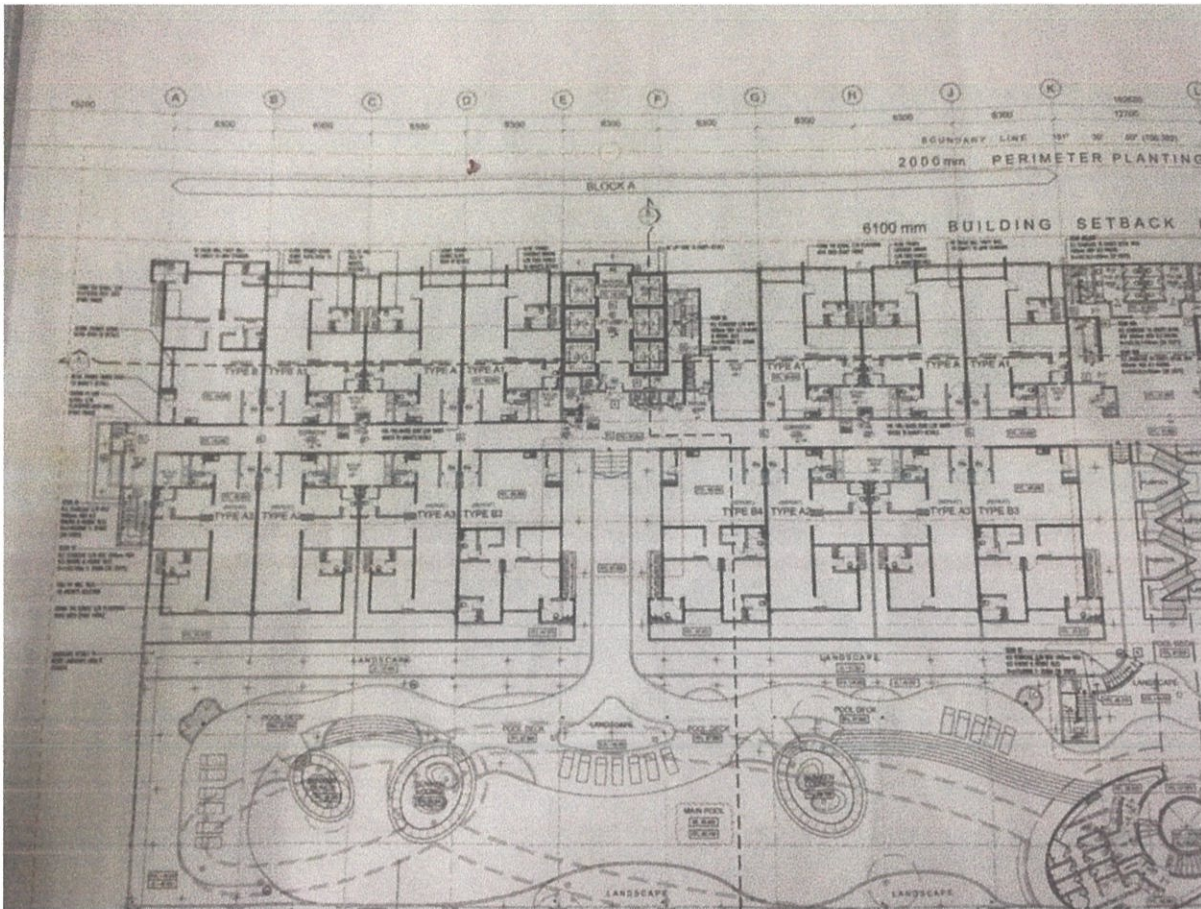


Figure 3.6 : The Site Plan for PHASE 2A THE HAVRE

Source : Courtesy of Kenwingston

The figure above shows the site plan for PHASE 2A THE HAVRE where 3 works are undergoing at the same time. Which are, Progress works at LVL 36th – 39th, ‘Tan Sri Sitewalk’ works at LVL 20th – 30th and Pre Delivery Inspection(P.D.I) works at LVL 9th. I was assigned to handle the ‘Tan Sri Sitewalk’ at typical floor. Tan Sri Datuk Chai Kin Kong visited Jalil Emas and The Havre weekly, which means the first sunday of the month is where he visited Jalil Emas typical floors, conducted by Mr. Steven Chong the project manager for phase 1 and Mr. Jeffrey the architectural supervisor for phase 1A and 1B. The second Sunday of the month is The Havre turns, to be inspected by him. Both skygarden and typical floors needed to be ready for the sitewalk. The Director, Mr. Lew Kok Sin, and Mr. Ryan Tang, Mr. Fakhruddin the project manager for Phase 2A and 2B, including the architectural supervisors and the safety team were involved in conducting the sitewalk.



Figure 3.7 : Tan Sri Sitewalk

Source : Courtesy of Kenwingston

‘Tan Sri Sitewalk’ works happened right after progress works have been completed at the floor. Progress works involve in installation of tiles, doors and door frames, windows, and plastering works at the whole floor including the corridor, liftlobby and staircase area. After all of the above have been installed, I have to conduct a team to undergo defects and housekeeping works for Tan Sri to visit the typical floor within two weeks. One level per week is the period of time given. My task is to minimise the amount of defects ; complete the unfinished progress works, housekeeping the floors and prepare the key to locked the doors by supervising and instructing the workers to get their task done before the ‘Tan Sri Sitewalk’ occasion at PHASE 2A THE HAVRE typical floors.

3.2 Methods of identifying building defects

First of all, gain knowledge about the types of high-rise building unit defects. In terms of, the type of defects that existed at the sections and rooms of the unit houses. Which are bathroom defects, yard defects, bedroom defects and living room defects. The knowledge and information assist in spotting a defect that looks normal to others. Hollow tiles were a great example of the statement, where from the external side of it looks perfectly align and level. But, on the inside it was hollow which means no mortar is present. Due to that defect, it can cause the tile to crack and damage easily when impact is applied. With the information of defects being grasped, time could be spared. This is because, not all flaws are defects. Such as, the colour of the tiles are not similar. Maybe it is because of the lighting or it was design that way. Another example is, the thickness of the tiles skirting is described as too thick. It looks thick but it is in an acceptable range of measurement which is in between minimum 12mm-20mm maximum thickness. Thus, gain knowledge about defects first hand to being able to identify the ftype of defect and avoid unwanted actions to be taken towards unnessecary defect to save both money and time.

Furthermore, defects were identified by using basic materials such as, measuring tape, level, ball bearing, flashlight, sense of touch, and a pair of eyes. The measuring tape is used to measure the skirting thickness, height of the door gap, drop height in the bathroom, and etc. Ball bearing is used to discover hollow tiles by knocking it a few times against the tile until a loud 'tok' sound is heard which indicates that the tile is hollow and needs to be replace. Then, flashlight is used to determine yard defects. Sense of touch and a pair of eyes means we have to touch everything that looks like a defect in the unit house. The pair of eyes brought the meaning of observing the defects critically in all 15 units at all sections of the house.

Last but not least, material and finishes defects such as doors, windows, fittings, laminated parquet floor is determine by conducting tests. Which are functionality and motion test. Functionality test is where we test the material whether it is functioning well or not. Motion test is where we test the finishes by applying light impact or load onto it and see whether it damages or not.

The knowledge on measurements of a material is also crucial in identifying a defect. For instance, the acceptable measurement of tiles skirtings is in between 12mm – 20mm and 5mm is the required height for the door gap. If we do not know what the measurements are, minor things like the skirting thickness and the door gap would be ignored and unnoticed.

3.2.1 Bathroom defects



Figure 3.8 : Bathroom 'Grouting' defect

Source : Courtesy of Kenwingston

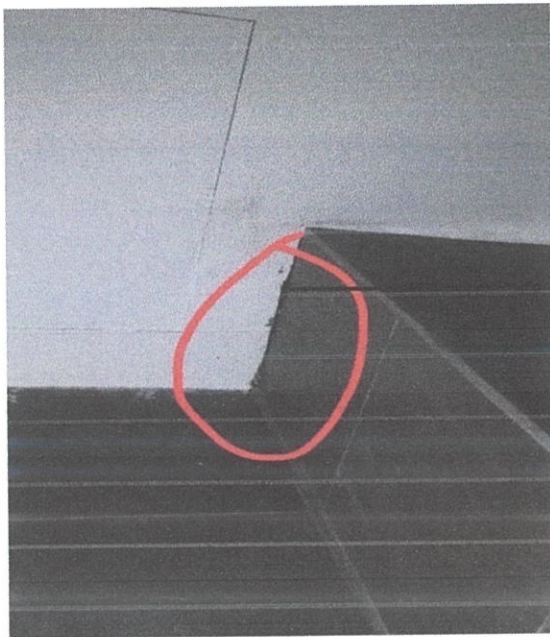


Figure 3.9 : Bathroom 'Chipping' defect

Source : Courtesy of Kenwingston

Figure 3.8 shows the grouting defects which is caused by the mortar not being applied evenly by the workers. If it was not applied evenly, the grout thickness is not the same where some of them are extremely thick and some of them were thin. Which then cause it to be crack and a hole is present from the cracks in time at the thin part of the grout. The defect was identified by using the sense of touch where we gently slide our finger along the grout to make sure that the grout is firm and to checked whether holes are present during the touch.

Chipping is another term of peel off of the tiles edges as shown on figure 3.9. It was cause by an impact or a collision with a hard material. It also could happened during grouting works where the sharp edge of the scrapper hits the tiles edge ad causes it to chipped. The defect was identified by the critical sense of observation. The bathroom needs to be critically inspected by the help of a flashlight in order to spot the chipping defect because it is micro in size.



Hole in the ceiling is present. Due to human errors.

Figure 3.10 : Bathroom 'Ceiling' Defect

Source : Courtesy of Kenwingston

The defect is caused by untidy workmanship or it occurs during housekeeping progress where at first the ceiling was intact until a worker accidentally poke it and cause a hole by using a scrapper when they are trying to clean up the tiles outline. This defect was identified by using the sense of touch and the sense of observation. The holes came in different sizes where some of them were extremely tiny and some of them were tremendously large. Firstly a staircase is used to climb up to the ceiling. Then, gently touch the ceiling with the index finger along the edges of the ceiling. Bear in mind that the edges are extremely fragile because stopping compound is used to cover up the gaps in between the suspended ceiling slab and the tiles. After it have been touched, observe the ceiling by using a flashlight closely to spot holes.

3.2.2 Yard defects

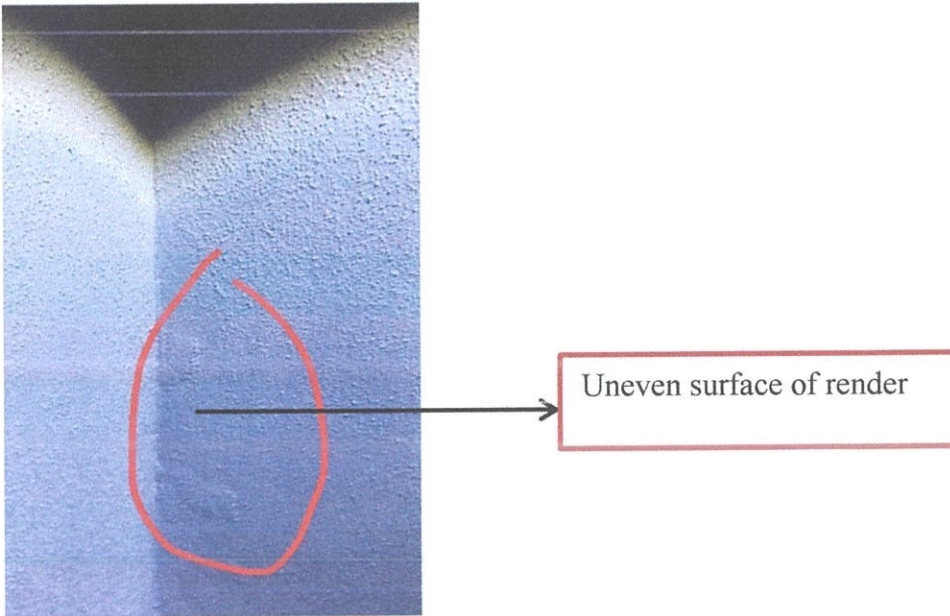


Figure 3.11 : Yard Defects

Source : Courtesy of Kenwingston

The uneven surface of render is due to the uneven amount of overlapping of render coats to the parts of the wall. The defect was identified by using a specific flashlight which is in a rectangular shape. It was very comfortable to use due to its size as big as our palm. Level the flashlight against the wall. Then, slightly move it around the surface of the yard wall to spot uneven surface as seen on figure 3.11. A shadow will appear at the edge of the wall if the surface is uneven. Besides that, Level is also used to determine whether the rendered wall is evenly coated or not. After it had been spotted, captured the photo as reference.

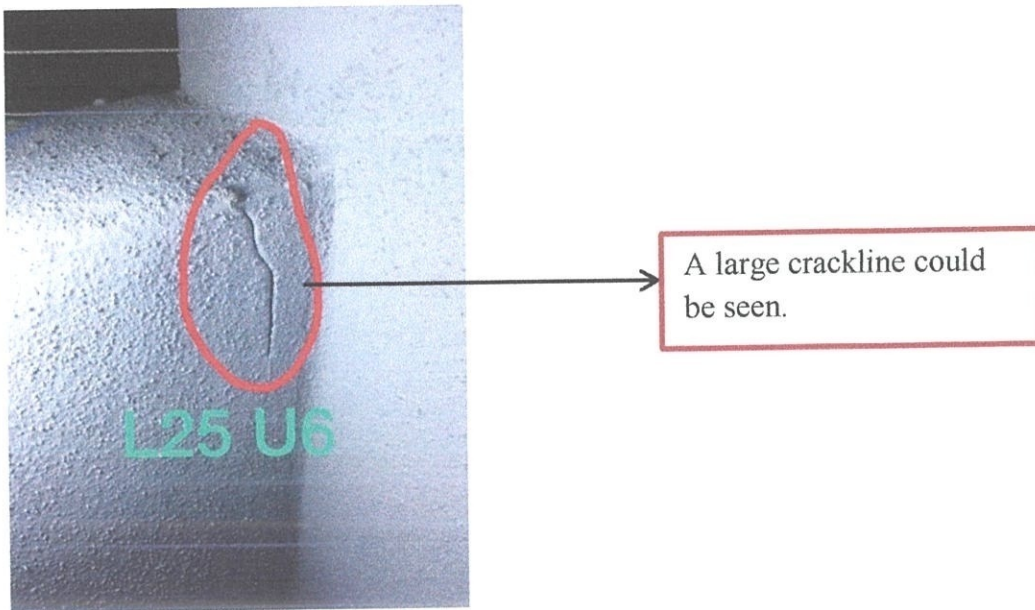


Figure 3.12 : Yard Defects

Source : Courtesy of Kenwingston

Figure 3.12 shows a large crackline on the surface of the yard wall which is caused by colliding with an when it was still not yet hardened. Identified by using a flashlight.

Besides that, the yard surface needs to be rough in surface with micro stones covers the whole surface of the wall. If a smooth surface is detected than it is considered as a defect. In order to spot the defect, a flashlight and a sense of touch is used. Firstly, level the flashlight against the lower part of the surface of the yard wall. Then, face the rectangular shape flashlight upwards. A shadow of micro stones is present which indicates the surface is normal. But, when the shadows are not present, it means the surface is smooth and being labelled as a defect. In order to make sure that it is a defect, use the sense of touch to touch the surface of the labelled part of the wall. If it is smooth, it is a defect. If it is rough then it is acceptable.

3.2.3 Bedroom defects

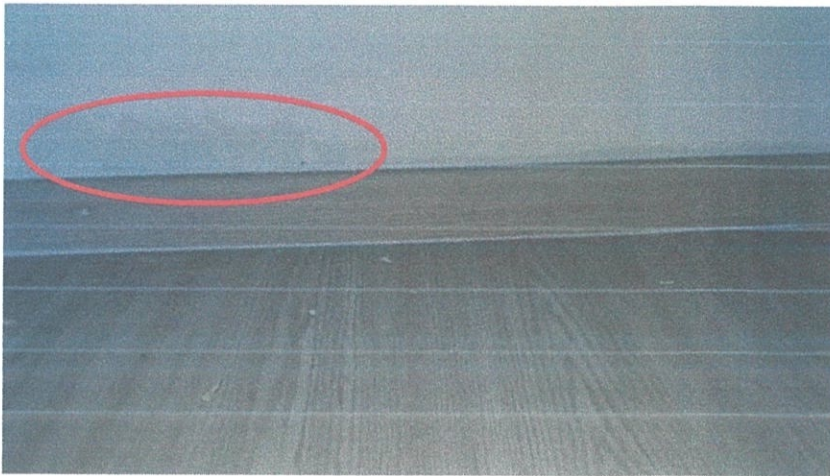


Figure 3.13 : Bedroom 'Skim' defect

Source : Courtesy of Kenwingston

The figure above shows skim defects in the bedroom. After the laminated parquet skirting have been installed, some of the places were damage during the process. Skim is the undercoat for the wall by using Asian Gympsum Compound/(ASG). After the undercoat layer of skim is applied, only then painting works could be done. The defect is identified by using a flashlight and the sense of observation.

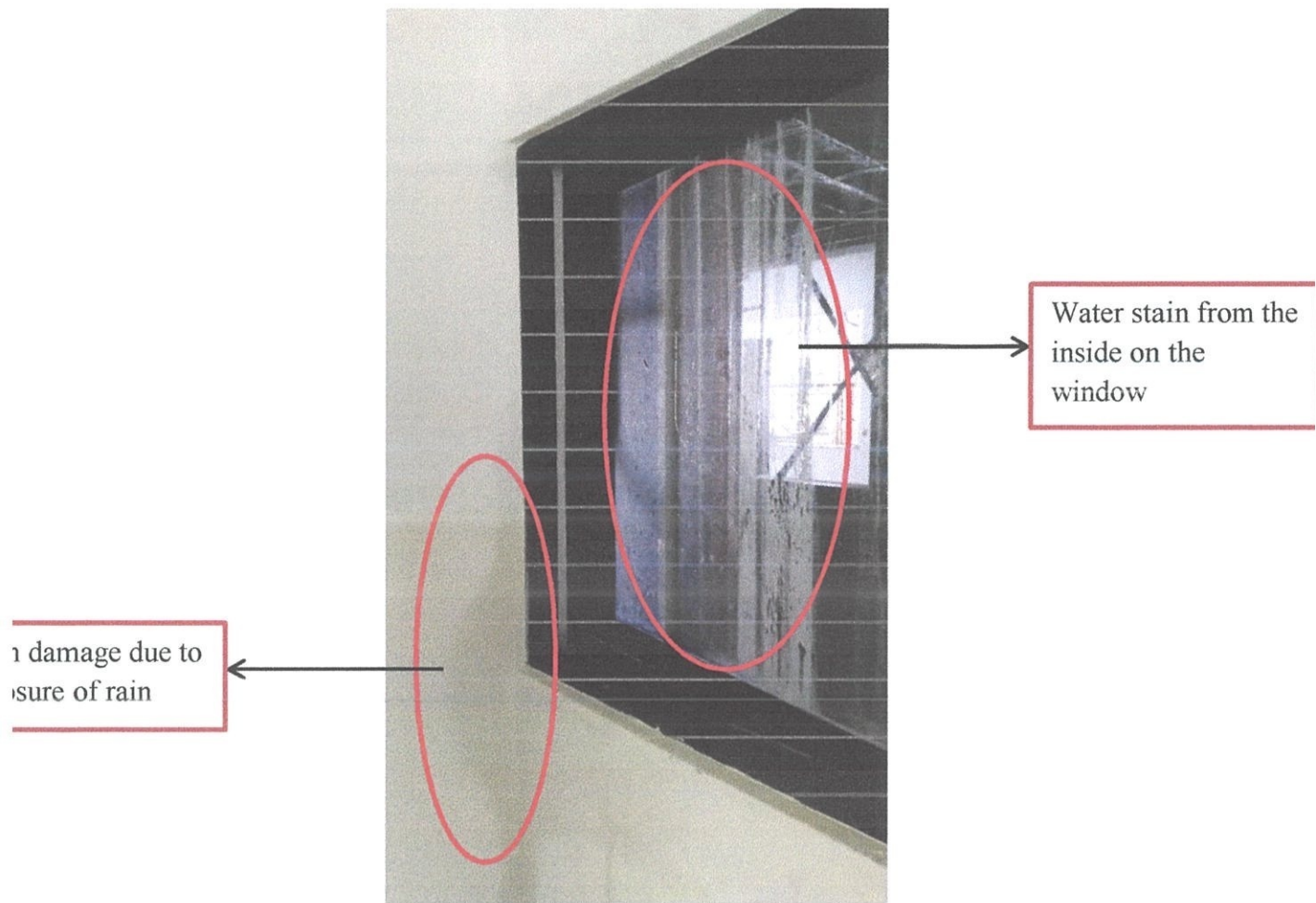


Figure 3.14 : Bedroom window and skim defect

Source : Courtesy of Kenwingston

The figure above is a combination of 3 defects which are window defect, laminated parquet floor defect and skim defect. It all started with the window defect, where water can pass through it due to the window being unable to close. The way to identify this defect is by conducting a functionality test towards the window. Firstly, check whether it can be fully open without any friction occurred. Then, proceed to test the handle of the window by twist it downwards to locked it. If it was unable to be locked, or to be twisted, than that is a defect. Window defects needed to be taken seriously. This is because, if the window can't be closed rainwater could pass through it and make a puddle in the bedroom on top of the laminated floor. If that happens, a disaster would occur.



Figure 3. 15 : Laminated Parquet floor defect

Source : Courtesy of Kenwingston

The laminated parquet floor can't be expose towards water. It could damage the parquet by the growth of fungus and the parquet would peel off after a week. The way to identify this defect is by using the motion test. Where we step on the required with one foot and jogs it at the same place with the other foot. By doing so, if water is present we could felt the surface is bloated by stepping on it a few times. The motion test is only applied to laminated floor.

3.2.4 Living Room

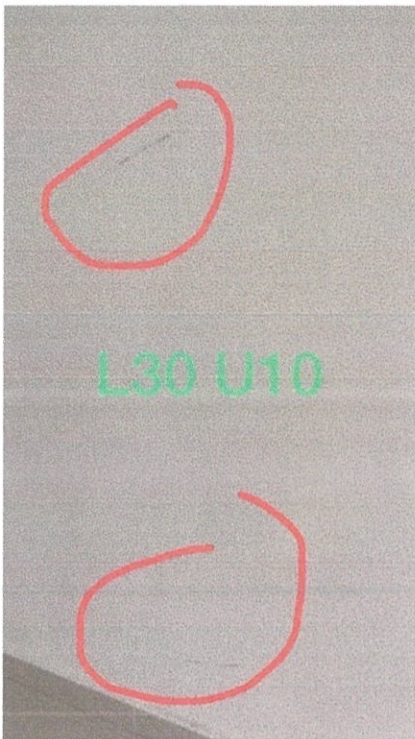


Figure 3.16 : Living room defect

Source : Courtesy of Kenwingston

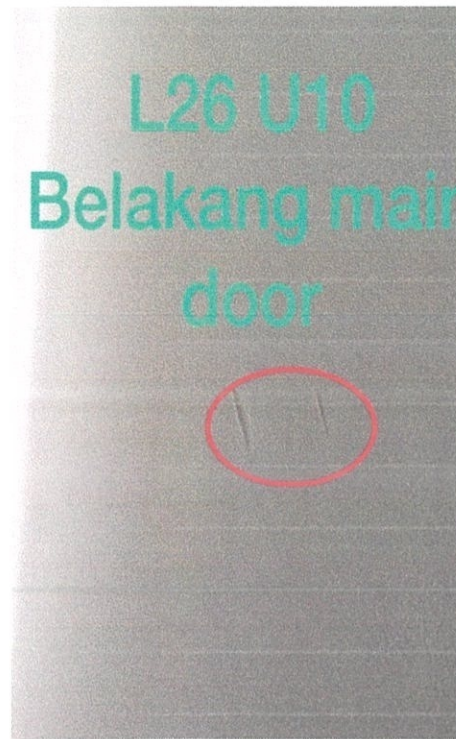


Figure 3.17 : Living room defect

Source : Courtesy of Kenwingston

Figure 3.16 and 3.17 shows the same type of defects which are skim defects. But, the cause of the defects are different. Figure 3.14 defect is caused by colliding of materials such as scaffolds. While figure 3.15 is cause by human error. The workers did not plaster the wall to fill in the gaps as shown before skim coat is applied. Thus, gaps are present on the surface of the wall. In order to identify the defects, observation is used to spot the defects.

3.2.5 Material defect

Material defects could only be identified by critical observation. There are 2 possibilities that made the defect, it happens due to collision with other objects that damaged the materials or eventhough, the materials are damage the workers still used the material to be installed on site.

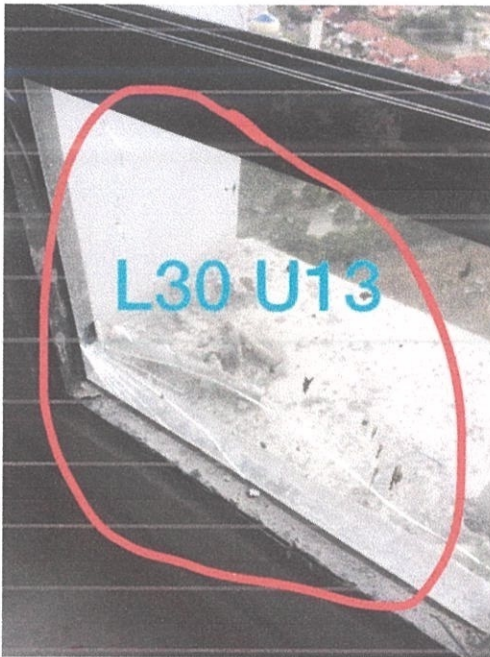


Figure 3.18 :Living room 'Window' defect

Source : Courtesy of Kenwingston

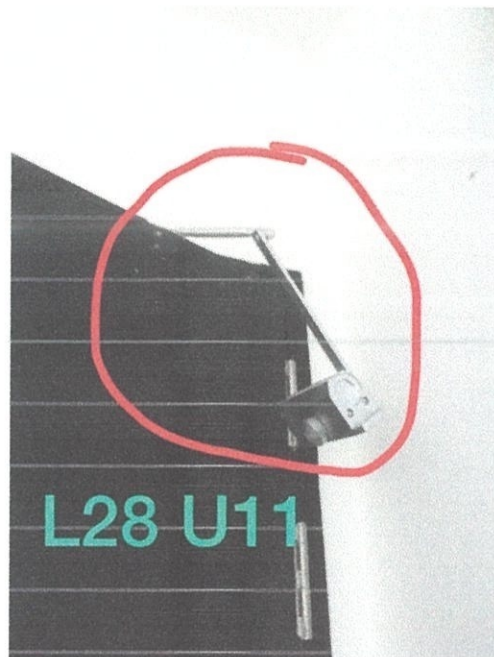


Figure 3.19 :Main Door 'stopper' defect

Source : Courtesy of Kenwingston



Figure 3.20 : Door frame 'Hinge' defect

Source : Courtesy of kenwingston

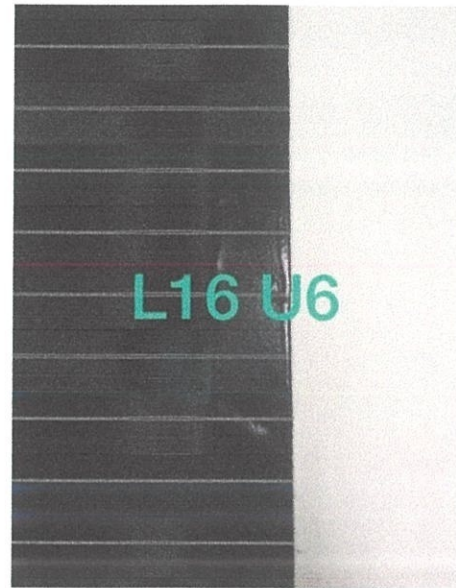


Figure 3. 21 : Door frame 'Crooked' defect

Source : Courtesy of Kenwingston



Figure 3.22 : 'Chipping' of laminated floor

Source : Courtesy of Kenwingston



Figure 3.23 : 'Door leaf' defect

Source : Courtesy of Kenwingston

3.3 Methods of identifying building defects

After the defects have been identified, the parties involve for the defects went to the section on where the defects were located in the house unit and discuss about it, in order to find the simplest solution for the defect. The simplest solution means the solution that requires less money and time to rectify it.

3.3.1 Bathroom defects

The bathroom defects are grouting, chipping of tiles and holes on the ceiling. For grouting and chipping of tiles, the sub-con needs to immediately come to the bathroom to see the defects. After a few discussion was made, all of us came up with the solution which are grout for grouting defects and welding for chipping tiles defect.

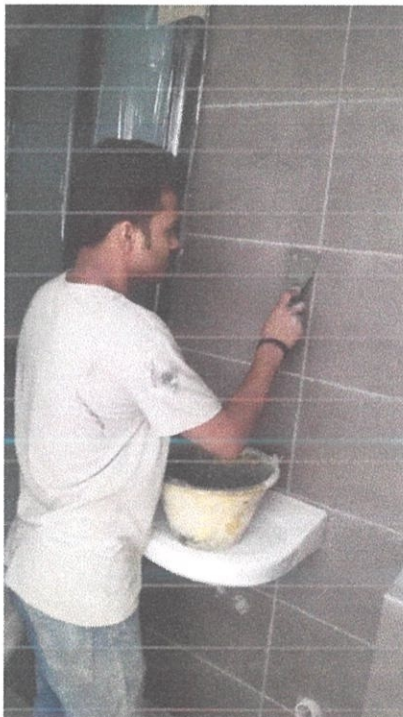


Figure 3.24 : Grouting works

Source : Courtesy of Kenwingston

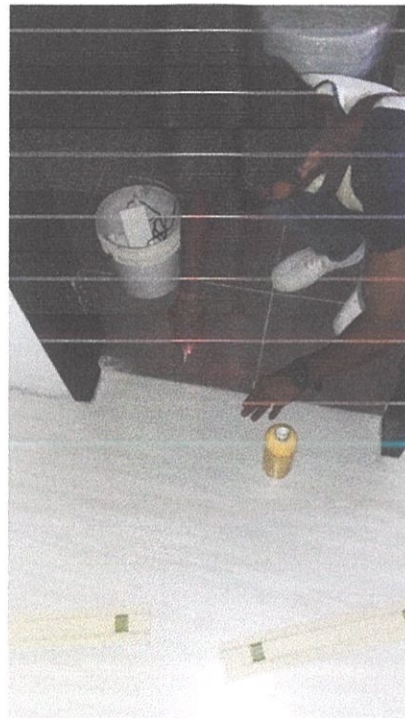


Figure 3.25 : Welding works

Source : Courtesy of Kenwingston

Grouting works is where the process of closing the gaps with a cement render by using a scrapper. The cement render is mixed with water at first with the ratio of 1 bag of cement : 3 buckets of water. After it was mixed, a small portion of it was put in the bucket to make it easy to be carried around for grouting works. Apply a little bit of cement to the gaps and holes. Use scrapper to spread it evenly on the gaps.

Welding works, involve in melting a ball like stone using a RM1000 machine powered by a power bank. Firstly, the machine is plugged in the power bank. Then, the machine with the size of our hand is pressed to make the tip become hot, which is made out of steel, flat in size, and a 2D rectangular in shape. After 5 seconds, the tip is then use to melt tiny parts of the ball. After parts of the stone is melted, the liquid is then applied to the chipped part of the tiles. A specific spray that makes the melted part shine is used right after the melted stone is applied. Lastly, wipe off the spray stain to make the melted part to looked similar as in colour with the tiles.

3.3.2 Yard defects

Yard defects are rectified by apply back the cement render to the defect. That is the only way to rectify it.

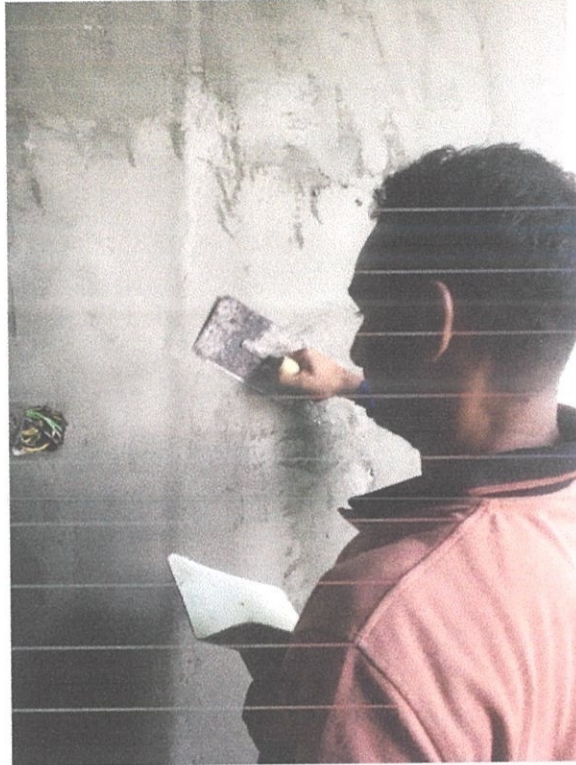


Figure 3.26 : Render works

Source : Courtesy of Kenwingston

The yard render started with mixing of the cement render with water. Then, apply it on the defect part of the yard wall. Spread the render evenly as the first layer. 'Tatai' is the term use on site. Then, use sponge to make the surface become hard by rubbing it evenly until a micro stones is formed at the surface.

3.3.3 Bedroom defects

The bedroom defects consist of more than one parties involve. So, it's a bit complicated in solving the defects. For example the window defects. Being unable to close, shattered glaze, water being able to pass through are the defects that could produce more defects in the bedroom specifically. Rainwater is the bedrooms greatest enemy. If rainwater passes through the bedroom, thus a few more defects are produced. A window defect could produced, skim defect from which the rainwater hits the internal wall of the bedroom Besides that,with exposure towards excessive water , It can cause the parquet to be infected by fungus, to peel off from the floor and to become bloated on the surface of the laminated floor.

So, the solution is to repair the window defect as soon as the defect is identified to avoid other defects from producing. If water passed through the window, there is only two methods that could be use to rectify the defect. Firstly, checked the external wall whether it is already coated with render or not. If render is applied, that means the problem is the window. But, if its otherwise, then the outer part of the window needs to be rendered properly and coat it with a specific paint to make it more effective in avoiding water from entering the window.

3.3.4 Material defects

Material defects needed to be specified in quantity available on site. The only way to solve the defect is by replacing them. But, not all material defects could be rectified. For instance, door frames that are damaged needed to be ordered right after the defect have been spotted. In this matter, we would be working with the contract department and also sub-contractors on the quantity materials on site and the amount of material that needed to be come out with a delivery order(D.O) on the defected material that could not be rectified.

3.4 Execute the rectification works for the building defects

After the defects have been identified including the solution for the defects have been discussed, the implementation of the solution for the defects are made. Have information on who's in charge for the defects beforehand to ease your task. When the solution for the defects have been determined, the supervisors will instruct the parties involved to start to work on the defects immediately. A period of time is given by me personally for the sub-contractors to finish up their defect works. In order to know the suitable deadline for the sub-cons to finish up their work, is by having knowledge on the method of rectifying the defect works. So, a suitable deadline is set up for them. The deadline is not comfortable, it must be at the minimum point of tolerance. Which means, the period of time is tight. If they fail to execute their task before the deadline, memo is released as warning for the first day after the deadline. Backcharges or fine have to be made to the parties up to RM1000 a day after the second day. By doing so, the sub-cons. would definitely finish up their task before the deadline given.

The parties or sub-contractors involve are, Ceria Kembangan sdn. bhd. tiling company(CNK), Xun Hip Tiling sdn. bhd., Beaumont, Pembinaan YCS berhad, and Columbus Woodlife. These are the sub-contractors that were hired by Kenwingston to undergo architectural works at The Havre. Tiling defect works is rectified by, CNK and Xun Hip. Window defects, rectified by Beaumont. Yard render defects were rectified by YCS and lastly, laminated parquet floor were rectified by Columbus Woodlife. So, after having information about their works my duty is to notified them up for the defects that I have found from regular inspections and have them execute the task immediately. For example, grouting defects were found by me during inspection. I have to personally ask Xun Hip or CNK to arrange the workers for me to undergo defect works at the Level and unit required.

The worst case scenario is when we can't finish up the defect works at the floor required due to lacking of manpower. During daily meeting at 3.00pm the matter was brought up by me to notify the Director, Project manager and the team that manpowers are lacking and it needed to be added. The proposed suggestion is approved due to the reasonable excuse.

Chapter 4.0

CONCLUSION

From the case study, it is concluded that defects are matters that needed to be taken seriously. The impact of a defect could cause a company's reputation to blemish. Eventhough it was a minor defect where small holes are present, the side effects are harmful. The percentage of defect could be lessen if the objectives above are followed. Inspections and supervising helps in reducing the amount of defect at a high rate. Due to, being able to identify the defects by having knowledge about it, finding solutions for the defects and having information about the person in charge of the defects. Kenwingston carried out the works differently in order to minimise the amount of defects. There were 4 stages in total, where the progress works as stage 1, 'Tan Sri Sitewalk as stage 2, Pre delivery inspection on stage 3, and Certificate of Completion and Compliance(CCC) as the last stage before having the unit house to be handover to the clients which is a great system of minimising the amount of defects. It is a must for developers who offers houses that costs RM500k and above to have such effective system on the reducing amount of defect.

The task given was challenging and intense at all times because every day is not the same in the construction industry. The situations were vary from time to time. The process of learning will never stop in this field. Despite of all the headache days at work, tonnes of knowledge were gathered both theoretically and practically due to the case study. Defects could not be 100% fully dispose. Nothing is perfect including a high-rise building unit houses. Even so, If the system and objectives were applied and followed, defects could be lessen in a high-rise building unit houses in the possible future.

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