DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

DEFECTS IN CONSTRUCTION

Prepared by:

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2017206538

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

DECEMBER 2019

It is recommended that the report of this practical training provided

by

Putri Saghirah Nur Binti Mohamed Nasri

2017206538

entitled

Defects in Construction

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 herein, prepared during a practical training session that I underwent at YMA Bina Sdn Bhd 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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Name : Putri Saghirah Nur Bt Mohd Nasri

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Date :13/12/2019

ACKNOWLEDGEMENT

At the very beginning, I would like to express my deepest gratitude to almighty Allah for giving me the strength to complete my BGN 310. Praise upon Him, without His blessing, I would not have completed this report on "Defect in Construction" within the stipulated time.

The internship opportunity I had with YMA Bina Sdn Bhd was a great chance for learning, getting experiences, and professional development. During the five months of my internship work, I have received many cooperation and generous help in collecting information and preparing this report from their staff, which I would like to put on record here with deep gratitude and great pleasure.

Firstly, I am grateful to my departmental supervisor Mrs. Aida Azlin. She had the kindness to accept me in his company and guide me through my internship with advice, feedback, and patience despite her busy schedule. Her constant guidance and advice played a significant role in implementing the report.

Then, I would like to thank my supervisor lecturer, En Wan Akmal Zahri Wan Zaharuddin who is the person in charge of my internship for his valuable guidance and advice. He had always time to answer all my questions concerning my internship. Without his kind supervision and proper guidance, this study would have been a little success.

Other than that, a special thanks to all my classmates for sharing their experiences, time and commitment especially during finishing this internship program. I am grateful because I have a lot of friends who were always there for me to help and support me throughout completing the internship program.

Lastly, my internship journey would not have been possible without the support of my parents who supported me physically and emotionally. Not to forget, I would also like to thank the countless experts who have offered guidance, feedback, and suggestions along the way.

ABSTRACT

Construction defects are most common and frequently arising in construction projects due to many factors which are poor workmanship and quality materials, lack of supervision, surrounding environment and temperature and limited time. Thus, this building defects significantly need scrutiny. Therefore, this report aims is to study what is defective construction. What do the common defects appear in construction? How the process of rectifying defects after the construction works is complete? And what solution is the best for the building defects? As a result, this report discusses the defects of a construction project on "Proposed Renovation of Existing R&D Building at Lot H.S. (D) 8147, P.T. No 4444, Lot 343, Seksyen 20, Bandar Serendah, Daerah Hulu Selangor Darul Ehsan for Perodua Manufacturing Sdn Bhd". In conclusion, the finding of this study is to alert that not all the defective works are borne by the contractor, only at certain times and the role of the client during that period is important so that all defects can be remedied.

CONTENTS **PAGE NO**

LIST OF TABLES

LIST OF CHARTS

LIST OF FIGURES

CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

Building Defects; According to Webster's Dictionary, a defect is defined as lack of something necessary for completeness; shortcoming. It is also defined as an imperfection; fault; blemish. Another term for a defect is a deficiency. As in BS 3811 (Code of Practice, British Standard 1984) defects are defined as the deterioration of building features and services to unsatisfactory quality levels of the requirement of the users. (Ahzahar, Karim, Hassan & Eman, 2019)

A building or construction defect is a defect or deficiency in the design, construction, or materials on a construction project. Broadly speaking, building defects fall into two (2) categories: defects that affect the performance of the structure, and defects that affect the appearance of the structure. From a legal perspective, a building defect is defined in somewhat different terms. Legally, a building defect is a violation of the applicable building code, a violation of the standard of care in the community in which the project is located, or a violation of the manufacturer's recommendations (Robert S.Mann, 2007)

defects according to JKR 203A contract form include the following forms: -

a) defects

b) imperfection

c) spasm

d) other visible damage

And all of the above must be due to material or quality of work that does not fulfil the contract. Defects or damages arising from vandalism, customer or consumer abuse or otherwise fall into the category of the defect and the contractor is not responsible for it. The contractor is also not responsible for repairing defects resulting from design failures, deficiencies or defects which in terms of construction contractors have

complied with the contractual requirements of carrying out such work. (Mohd Nazir, 2016)

The defects discussed above cover all deficiencies inherent in the entire project including the work performed by the named subcontractor. The responsibility for repairing defects for work performed by the subcontractor is named on their liability. The contractor only needs to monitor and ensure that the defects listed are properly repaired according to the contract

"The nature and extent of the obligations of the contractor and the rights of the employer vary according to the terms of each contract, but in general an obligation to maintain the works imposes a wider duty than one merely to make good defects, and extends to matters of wear and tear, whereas the defects clause does not" (Furst, 2006)

In conclusion, what is required during construction is whether the contractor performs his duties using his expertise and controls the work reasonably and complies with the contract requirements.

1.2 Objectives

The objective is a specific result that a person or system aims to achieve within a time frame and with available resources. For this report, there are 3 aims to achieve.

1. To identify the common types of defects in construction.

2. To identify the process of the Defect Liability Process (DLP).

3. To investigate the problem and solution of the defect in the construction site.

1.3 Scope of Study

In this modern era, there are more and more high-rise buildings being developed by the clients or the contractors due to the reason for insufficient land spaces/use and a high population of people. Construction defects are very common and often arising or spot in the construction project, especially in the project which has poor management or supervision in the construction site. Building defects also occur to either the new building or the old ones. A construction defect can be known as a major problem in the construction industry that could cause the value of a building to decrease eventually and brought a negative effect on the building.

Malaysia, which one of the tropical countries with diverse climates tends to weather rapidly, particularly concerning external building materials. This implies that buildings in the country are exposed to external causes such as rain, wind, solar radiation including ultra-violet light; and atmospheric pollution. Fungal stain, harmful growth, peeling paint, erosion of mortar joints and defective plastered rendering and more. The main function of a building is to protect the occupants and contents from the weather, mainly rain, wind and extremes of temperature (Ahzahar, Karim, Hassan & Eman, 2019). A building must be structurally safe to survive.

The significance of this report is to identify the process of the Defect Liability Process (DLP) to get a better understanding of how to prepare for defect inspection. What to inspect? What to do if you find a defect? Secondly, to identify the common types of defects in construction such as peeling of paint, cracking, erosion of mortar, etc. Lastly, is to find the major causes of defects and how to determine the solution to minimize the defects

The study is carried out on the construction project of Existing R&D Building at Lot H.S (D) 9147, P. T NO.4444, Lot 6343, Seksyen 20, Bandar Serendah, Daerah Hulu Selangor, Selangor Darul Ehsan for Perodua Manufacturing Sdn Bhd.

1.4 Research Methods

Research methods are the strategies, processes or techniques utilized in the collection of data or evidence for analysis to uncover new information or create a better understanding of a topic. During the 5 months internship, there are 3 types of research method that has been used for collecting data which is observation, interviews and document reviews.

1. Observation

The observation has been done during the site visit on 9 August, and 10 September 2019.

2. Interviews

For the interview session, the writer used a semi-structured type of interview in which the interview is conducted with some set of questions and at the same time, more follow-up questions cropped up during the interviews to clarify and further expand certain issues. The interview is conducted with two important people which is the site supervisor of the Perodua R&D project and writer's supervisor who is recently certified with the Quality Assessment System in Construction (QLASSIC). The interview is carried out indirectly when the writer was assigned to the documentation work to get a better understanding of defects. Mostly the interviews either recorded on phone or written in a notebook. Not to forget, to other colleagues who offered guidance and feedback to all of the writer's questions despite their busy scheduled along the way enable the writer to understand what is "Defective in Construction"

3. Document reviews

For document reviews, the writer was able to collect more information from a monthly/weekly progress report, Request for Information (RFI), and Request for Inspection (RFWI) of the construction project.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

YMA Bina Sdn Bhd is a construction company in Malaysia, with the main office in 429, Blok 4, No.7, Persiaran Sukan Laman Seri Business Park, Seksyen 13, 40100 Shah Alam, Selangor Darul Ehsan. YMA Bina Sdn Bhd is a Bumiputera company G7 registered with Lembaga Pembangunan Industri Pembangunan Malaysia established on September 04.

Consoline Sdn Bhd holds 4 group companies under it which are Consoline Group Sdn Bhd, YMA Bina Sdn Bhd, YMA Facilities, and M&B Engineering. YMA Bina Sdn Bhd is one of the companies under Consoline Sdn Bhd. It operates in the Heavy and Civil Engineering Construction industry.

YMA Bina gets involved in a lot of fast-track projects which is mostly contracted within a year. There is 3 department in this company which is administration, contract, and operation. Operation department involved in the works of documentation and management, dealing with technical documents like blueprints and reports and perform tasks uploading, editing, printing and distributing them.

The mission of this company is "Being Distinctive and Excellence Builder" and the vision is "Being the Leader and Builder of Choice". The overview of YMA Bina Sdn Bhd is led by young and dynamic professionals in their respective fields.

COMPANY QUALITY POLICY

YMA Bina Sdn Bhd is committed to continuously strive to meet client's requirements with respect to project completion, specifications (workmanship quality) and regulations and statutory requirements to continually improve on the effectiveness of the quality management system.

2.2 Company Profile

LOGO OF COMPANY

Figure 2.1: Logo of Company

Date of incorporation: 4th September 2007

Authorised Capital: RM 1, 000, 000.00

Paid Up Capital: RM 1, 000, 000.00

BOARD OF DIRECTORS

1. Noranieza Bt Ali
2. Mohd Ajid Bin Masri

Company Secretary: Kas Consultancy Sdn Bhd

Auditor: Bal & Partners

COMPANY REGISTRATION

Company status: Bumiputera

Registered with CIDB: G7

Category: B, CE, ME

Registered with Kementerian Kewangan Malaysia

Registered with Pusat Khidmat Kontraktor

Certified with ISO 9001:2015 (Quality Management System) – Requirements

Scope of certification: Provision of construction services for building and civil engineering works.

Figure 2.2: Location of The Company by Google Maps.

Figure 2.3: View of The Company by Google Maps

2.3 Organization Chart

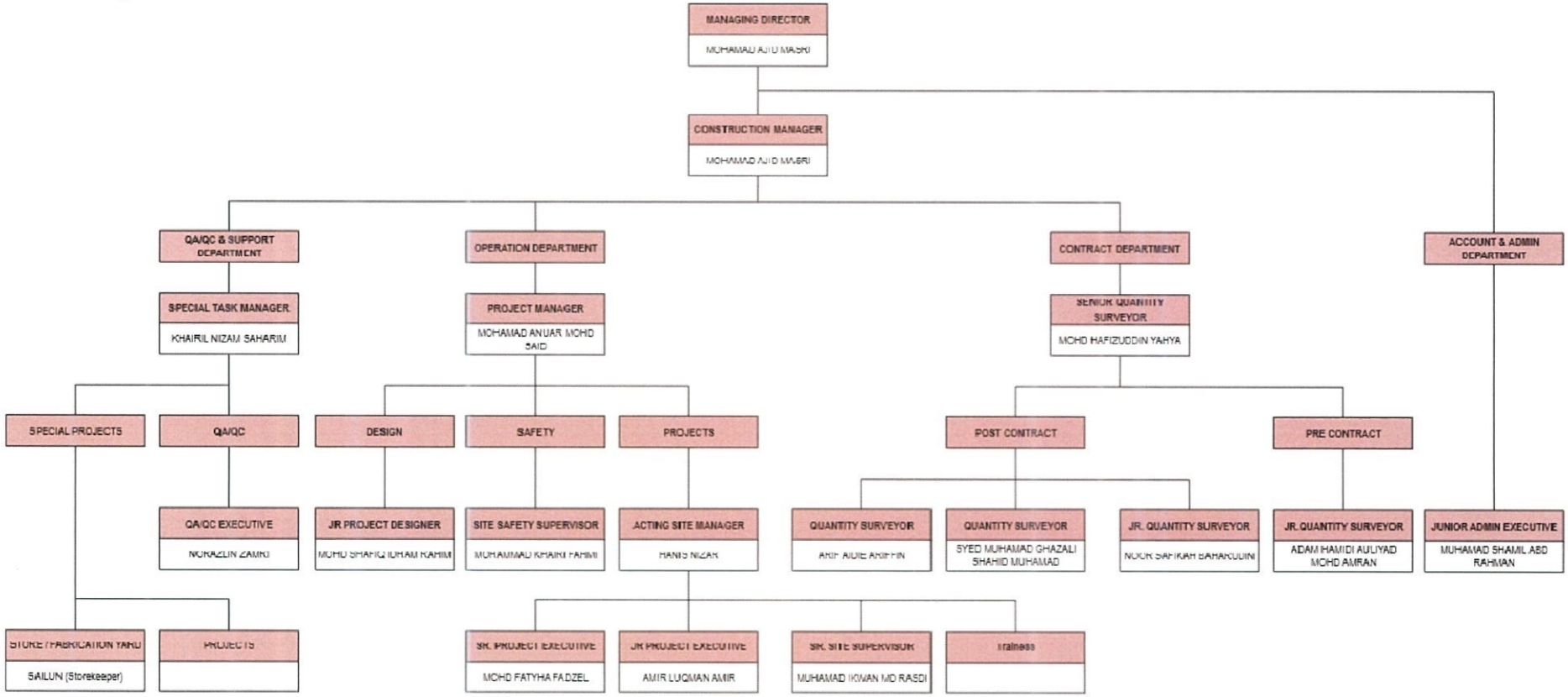


Chart 2.1: YMA Bina Organization Chart

2.4 List of Project

2.4.1 Completed Projects

Table 2.1: YMA Bina Completed Projects

No.	DESCRIPTION & LOCATION OF CONTRACT/PROJECT	CLIENT NAME AND ADDRESS	S.O / CONSULTANT INCHARGE	CONTRACT VALUE IN RINGGIT MALAYSIA (RM)	CONTRACT PERIOD	DATE OF COMMENCEMENT	**CONTRACT DATE FOR COMPLETION	ACTUAL DATE OF COMPLETION
12	Kerja-Kerja Ubahsuai Kaunter/Pejabat TH Klang Tingkat Bawah, Anggerik Mall 40607 Shah Alam, Selangor	Employer : Consoline Sdn Bhd Client : Lembaga Tabung Haji		1,460,000.00	4 Months	16/05/2013	15/10/2013	15/10/2013
13	Kerja-Kerja Ubahsuai Kaunter/Pejabat TH Kangar, Tingkat Bawah Satu Dan Dua Bangunan TH Di Atas Lot 1483 Dan Lot 1484 Batu Hampar Seriap Kangar Perlis	Employer : Consoline Sdn Bhd Client : Lembaga Tabung Haji		2,355,000.00	3 Months	16/5/2013	9/8/2013	9/8/2013
14	Extension Car Parking At Lot 5040 Honda Malaysia PO No. ADM/13/053/3005/200913	Honda Malaysia Sdn Bhd Hicom Industrial Park Pegoh P O Box 70 78000 Alor Gajah Melaka		734,879.30	3 Months	01/11/2013	01/02/2014	01/02/2014

Table 2.2: YMA Bina Completed Projects

No.	DESCRIPTION & LOCATION OF CONTRACT/PROJECT	CLIENT NAME AND ADDRESS	S.O / CONSULTANT INCHARGE	CONTRACT VALUE IN RINGGIT MALAYSIA (RM)	CONTRACT PERIOD	DATE OF COMMENCEMENT	**CONTRACT DATE FOR COMPLETION	ACTUAL DATE OF COMPLETION
16	Kerja-Kerja Ubahsuai Kaunter/Pejabat TH Rembau, D Tingkat Bawah Satu Dan Dua Bangunan TH Di Atas Lot 53 Jalan Le Poon 71300 Rembau Negeri Sembilan	Employer : Consoline Sdn Bhd Client : Lembaga Tabung Haji		1,609,697.00	3 Months	1?/12/2013	02/11/2014	02/11/2014
17	Cadangan Merekabentuk, Membina, Menyiapkan, Menaiktaraf dan Mengubahsuai Apartment Blok 7 Kepada Hotel Serta Kerja-Kerja Berkaitan di Intekma Resort & Convention Centre, Seksyen 7, Shah Alam, Selangor	Employer : Consoline Sdn Bhd Client : Universiti Teknologi Mara (UiTM)		4,?84,835.00	6 Months	25/07/2013	24/02/2014	24/02/2014
18	Cadangan Tambahan dan Perubahan Kepada Kompleks Institut Jantung Negara di Tingkat 6 Blok C Sediaada di Atas Lot PT 6 (No. 145) Jalan Tun Razak, 50400, Kuala Lumpur	Employer : Consoline Sdn Bhd Client : Institut Jantung Negara		4,490,000.00	15 Weeks	15/09/2014	29/12/2014	29/12/2014
19	Tawaran Kerja -Kerja Naiktaraf Bangunan dan Ubahsuai Kawasan Lobi, Kaunter/Pejabat Islamic Financial Services Centre (IFiC) dan ATM di Pejabat TH, Jalan Bandar Kaba, Melaka (NO. RFQ : 201410030)	Employer : Consoline Sdn Bhd Client : Lembaga Tabung Haji, 20?, Jalan Tun Razak, Peti Surat 1?025, 50732 Kuala Lumpur		1,500,000.00	8 Months	6/3/2015	15/6/2015	30/6/2015

Table 2.3: YMA Bina Completed Projects

No.	DESCRIPTION & LOCATION OF CONTRACT/PROJECT	CLIENT NAME AND ADDRESS	S.O / CONSULTANT INCHARGE	CONTRACT VALUE IN RINGGIT MALAYSIA (RM)	CONTRACT PERIOD	DATE OF COMMENCEMENT	**CONTRACT DATE FOR COMPLETION	ACTUAL DATE OF COMPLETION
20	Defect Rectification for Common Area for Cadangan TambahanDan Pengubahsuaian yang mengandungi A) Perubahan Fasad Hadapan Dan Belakang Termasuk 112 Unit Rumah Teres 3 Tingkat dan 1 Tingkat Besmen (Blok A,B,C,D E,F,G,H S I) B) Perubahan 13 Unit Town House kepada 7 Unit Rumah Teres 4 Tingkat dan 1 Tingkat Besmen serta Perubahan Fasad Hadapan dan Belakang (Blok J) C) Merobohkan 3 Unit Town House Sedlada Dan Membina 1 Unit Rumah Kelab 4 Tingkat dan 1 Tingkat Besmen Pada Pembangunan Sediada di Atas Lot PT 3565, Jalan 1/70D Off Jalan Bukit Kiara, Mukim Baru Dalam Kuala Lumpur for MESSRS Kuala Lumpur Golf and Country Club Berhad (PI/KLGCC/PARCEL E/COM/AREA/15-01)	Employer : Consoline Sdn Bhd Client: Sime Darby KLGCC Development Sdn Bhd Block G 10th Floor No.2, Jalan PJU 1A/7A, Ara Damansara, PJU 1A 47301 Petaling Jaya Selangor		6,062,500 00	2 Months	18/5/2015	17/7/2015	15/12/2015
21	Tawaran Tender Kerja-Kerja Ubahsuai Pejabat TH Seremban Pejabat TH Port Dikson Dan Pejabat TH Jelebu	LEMBAGA TABUNG HAJI 201, Jalan Tun Razak, Peti Surat 11025 50732 Kuala Lumpur		7,472,945 94	4 Months	15/10/2015	19/02/2016	22/07/2016
22	Cadangan Kerja- Kerja Ubahsuai Di Ruang Sedia Ada Di Tingkat 6 Untuk "Primier Clinic" Di Institut Jantung Negara IJN/TENDER/14/2015	Employer: Consoline Sdn Bhd Client:" INSTITUT JANTUNG NEGARA No 145, Institut Jantung Negara, Wilayah Persekutuan, Jalan Tun Razak Kuala Lumpur		4,531,500 00	4 Months	17/5/2016	16/9/2016	16/11/2016

Table 2.4: YMA Bina Completed Projects

No.	DESCRIPTION & LOCATION OF CONTRACT/PROJECT	CLIENT NAME AND ADDRESS	S.O / CONSULTANT INCHARGE	CONTRACT VALUE IN RINGGIT MALAYSIA (RM)	CONTRACT PERIOD	DATE OF COMMENCEMENT	*CONTRACT DATE FOR COMPLETION	ACTUAL DATE OF COMPLETION
23	Tawaran Tender Kerja-Kerja Ubahsuai Kaunter dan Pejabat Islamic Financial Services Center (IFIC) Aras Bawah dan Aras Satu Menara TH Sentral, Block D, Plaza Sentral, Jalan Stesen Sentral, KL Sentral, 50470 Kuala Lumpur **No.RFQ : 201697158**	LEMBAGA TABUNG HAJI 201, Jalan Tun Razak, Peti Surat 11025 50732 Kuala Lumpur	Neutra Design Consultant Sdn Bhd	7,304,662.60	5 Months	24/10/2016	24/3/2017	25/5/2017
24	Renovation Of Paediatric Clinic & Ward Areas At IJN	INSTITUT JANTUNG NEGARA No.145, Institut Jantung Negara, Wilayah Persekutuan, Jalan Tun Razak Kuala Lumpur		61,230.00	6 Weeks	1/11/2017	6/12/2017	8/12/2017
25	Proposed Renovation, Refurbishment, Equipped and Maintenance of The New IJN Imaging Centre at Existing Radiology Dapartment, Ground Floor, Block B at Institut Jantung Negara **IJNTENDER/07/2016**	INSTITUT JANTUNG NEGARA No.145, Institut Jantung Negara, Wilayah Persekutuan, Jalan Tun Razak Kuala Lumpur	ANF Global Ventures	13,792,745.50	11 Months	3/1/2017	02-12-2017 EOT:30/3/2018	
26	Proposed PMSB Locker Room At 5345, Seksyen 20, Bandar Serendah Daerah Hulu Selangor Selangor Darul Ehsan For Perodua Manufacturing Sdn Bhd **ICFC/F/17/01/154/013/SK/009**	PERODUA MANUFACTURING SDN BHD Sungai Choh Locked Bag 225 48009 Rawang,Selangor Darul Ehsan	Kumpulan Ikram Sdn Bhd	4,692,398.30	05 Months	25/10/2017	15/03/2018 EOT:15/04/2018	

2.4.2 ON-GOING PROJECTS

Table 2.5: YMA Bina On-Going Projects

NO	DESCRIPTION & LOCATION OF CONTRACT/PROJECT	CLIENT NAME AND ADDRESS
1	Cadangan Menaiktaraf, Membina, Menyiapkan, Mentauliah, Mengujilari dan Menyelenggara Bahagian Dalaman Bangunan Pejabat Pengurusan Fasiliti Serta Kerja-Kerja Berkaitan di UiTM Shah Alam.	**UiTM** Universiti Teknologi Mara, 40450 Shah Alam, Selangor Darul Ehsan
2	Proposed Renovation of Existing R&D Building at Lot H.S (D) 8147, P.T No.4444, Lot 6343, Seksyen 20, Bandar Serendah, Daerah Hulu Selangor, Selangor Darul Ehsan For Perodua Manufacturing Sdn Bhd.	**PERODUA MANUFACTURING SDN BHD** Lot 1896, Sungai Choh, Mukim Serendah, Locked Bag 226 48009 Rawang, Selangor Darul Ehsan
3	Proposed Construction Of 3-Storey Guest House at No.102 & 104, Jalan Maarof, Bangsar Baru, Bangsar, 59000 Kuala Lumpur For Tetuan Seulawah Properties Sdn Bhd	**TETUAN SEULAWAH PROPERTIES SDN BHD** No.102 & 104, Jalan Maarof, Bangsar Baru, Bangsar, 59000 Kuala Lumpur

CHAPTER 3.0

CASE STUDY

3.1 Introduction to Case Study

The title of the project is to "Proposed Renovation of Existing R&D Building at Lot H.S. (D) 8147, P.T. No 4444, Lot 343, Seksyen 20, Bandar Serendah, Daerah Hulu Selangor Darul Ehsan for Perodua Manufacturing Sdn Bhd". YMA Bina Sdn Bhd as the main contractor and ARC Radius as the consultant. The site is located as shown in figure 3.1.

Figure 3.1: Site Location by Google Maps

This project gets the acceptance letter on 12 February 2019. The commencement date for the project is 25 February 2019 and the completion date are 17 June 2019 which takes a total of 16 weeks/3 months of the construction period. The contract sum of the project is RM 2,724,529.00

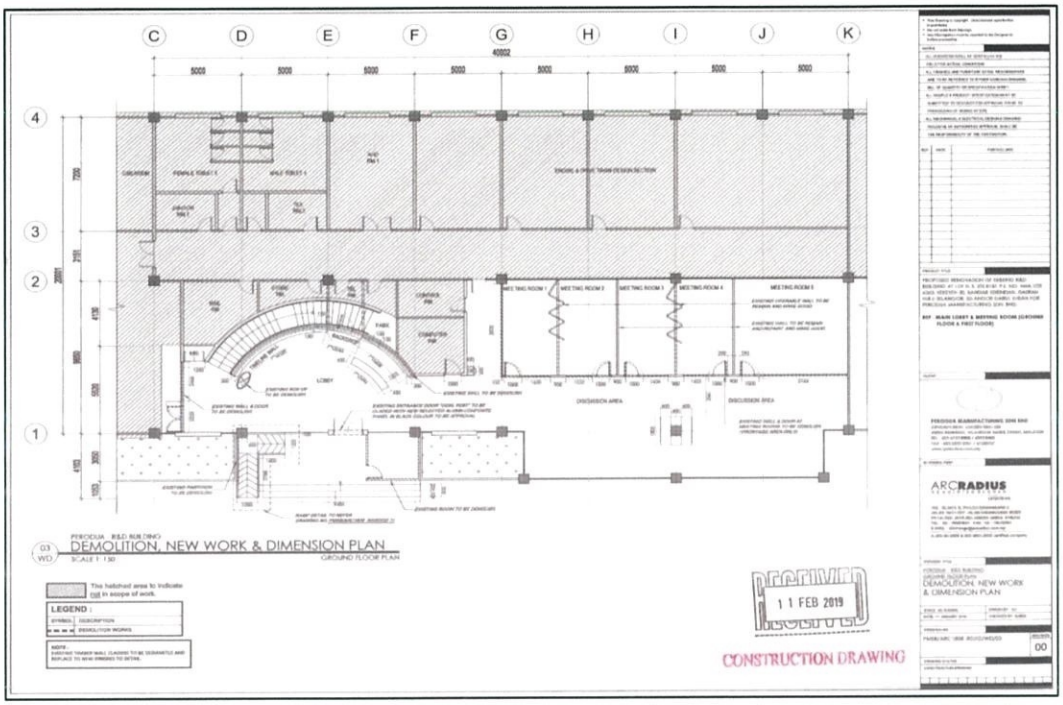


Figure 3.2: Ground Floor Plan

Source: Construction Drawing

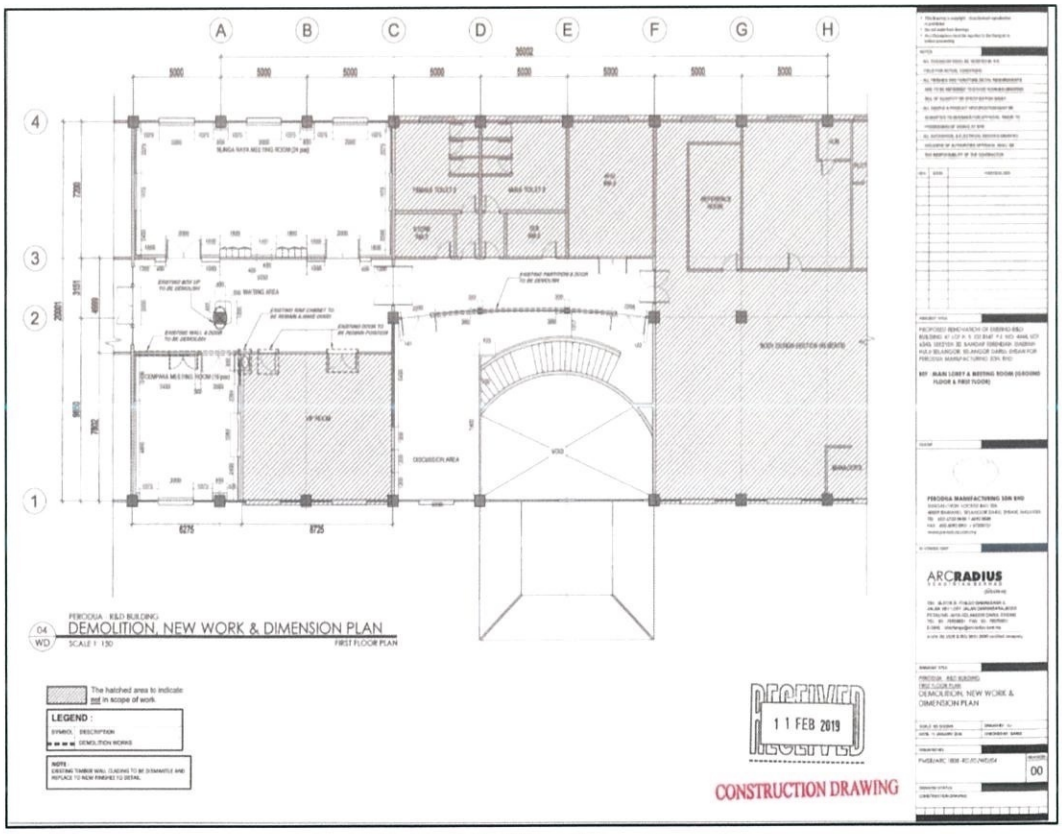


Figure 3.3: First Floor Plan

Source: Construction Drawing

3.2 To Identify the Common Types of Defects in Construction

3.2.1 Cracking of walls

Structural cracks as shown in figure 3.4 may be caused by many factors, ex: excessive movement of the building structure, unwanted ground settlement, serious overloading, and poor design. It is the nature of many construction materials to crack as they age and as they expand and contract, particularly with exposure to moisture as they get wet and dry out alternately.

Cracks result from drying out or taking up of moisture or from the initial drying out of material that cannot be avoided. Cracks also are often exaggerated; it means a natural reaction of the owner or occupiers of the building. Besides that, cracks may be an indication of instability of the structure, even though it is taken seriously, it will have little or no effect on the stability or another aspect of building performance apart from appearance. (Nadia, Bakri & Mydin, 2019)

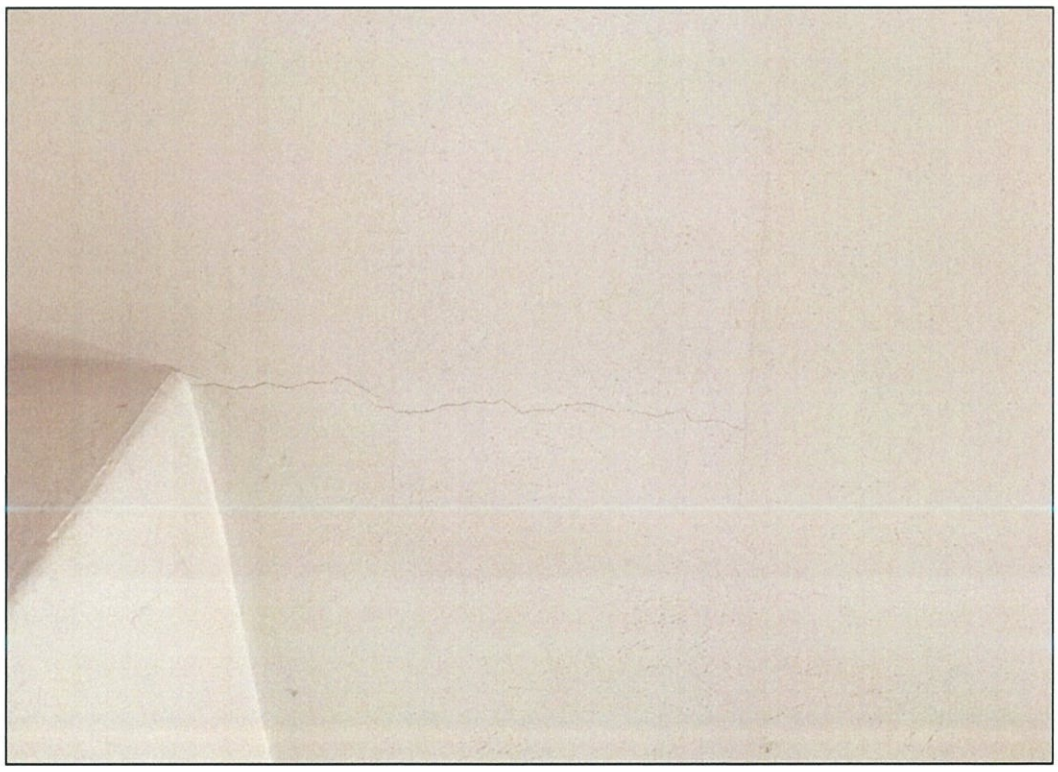


Figure 3.4: Hairline Cracks At Ceiling

Source: Google Images

3.2.2 Peeling of Paint

Peeling usually occurs on building facades, mainly on plastered walls, columns and other areas that are exposed to excessive rain and great dampness. Some buildings that are located near the sea may face a much higher risk once the signs of peeling paint are visible on the exterior walls. (Kasim N.D, 2009).

The majority of peeling paint problems occur on surfaces exposed to the rain, sun, and the variation degree of temperature. If paint peels from an interior wall as in figure 3.5, the reason for the peeling paint is most often due to improper preparation of the surface before painting. Thus, to repair and restore, repainting the wall that had peeling paint on it can be made to make it attractive again.

Figure 3.5: Peeling of Paint

Source: Google Images

3.2.3 Defective Plaster Rendering

Plaster or render is like mortar coating over the blockwork. The coating on the inside walls called plaster, then the coating outside the walls called render. Plaster and render are different. The render is generally richer and mostly in cement than the plaster due to weather-resistant.

Both plaster and renders have a different function. The plaster insides the walls to make the walls smooth, easy to clean, avoid insect, and for better appearance. Apart from that, the plasters act as protection against fire. For the renders, it is provided to protect them from the influences of weather.

Mostly the defective plaster rendering occurs on the external walls, column, and ceiling as figure 3.6. Normally caused by biological attacks arising from penetrating rain, evaporation, condensation, air pollution, dehydration, and thermal stress. The mold or harmful growth, insect, animals, and traffic vibration also will contribution causes of defective plaster rendering. Before being decomposed and broken apart, rendering may crack due to either shrinkage or movement in the substrate. (A Ghafar Ahmad).

Figure 3.6: Defective Plaster Rendering

Source: Google Images

3.2.4 Erosion of Mortar

Mortar is a mixture of sand and cement in the form of brick and blocks walls. The compositions of mortar are sand, water, and cement or lime. When it is dried, it became a rigid aggregate that is defined as building paste as shown in figure 3.7. While it was still wet, the mortar is spread along the edges of brick or stone.

A mortar joint is a function of the masonry block or brick wall. This is because there are strong and durable materials. Mortar joint is considering deterioration when having the sign such as:

i. Cracks are visible within the mortar
ii. The bond between brick and mortar is broken or the mortar is soft or crumbling
iii. Any portion of a mortar joint is missing

Mortar joints are not intended to be a permanent part of a masonry wall, but rather, an expendable component that does have to be replaced at intervals. Removing deterioration of the mortar joint is having through the repointing process and replacing it with new mortar. (Nadia, Bakri & Mydin, 2019)

Figure 3.7: Erosion of Mortar

Source: Google Images

3.3 To identify the process of the Defect Liability Process (DLP)

Liability as stated in Osborne Concise Law Dictionary is 'an amount owed; or subject to legal obligation; or the obligation itself, he who commits a wrong or break on a contract or trust is said to be liable or responsible for it'.

Defect Liability Period (DLP) is a common feature in all the standard form of construction contracts in Malaysia, PAM 98/JKR PWD 203/IEM/CIDB 2000. During the DLP, the Contractor is obliged and liable to rectify defects that appear between the period the Certificate of Practical Completion (CPC) is issued and the expiry of the DLP. Provision for this period is important and reasonable as the contractor cannot be burdened with the responsibility of repairing defects at all times. Therefore, the contractor is only responsible for certain periods and this period is stated or notified to the contractor when they wish to render with the information provided in the tender document. Apart from that, the employer normally will claim for the defective work and it is the most common claim that can be seen in every site.

In addition, defects can be distinguished into two types which is latent and patent defects. Latent defects are where the error is visible only after the element is constructed and used over some time whereas patent defects are discovered through testing or inspection during the DLP.

3.3.1 Issuance of Certificate of Practical Completion

The practical completion has reached within the contractor's opinion and a joint inspection is conducted. These visits attended by YMA Bina as the contractor, Perodua Manufacturing Sdn Bhd as the client, and those involved including ARC Radius Sdn Bhd as consultants. As a result of the visit, the project was implemented to the extent accepted by the guidelines

1. The project has been implemented and is ready to meet all the requirements of the contract in terms of materials used, specifications, designs, construction, quality of work and more.

2. The project has reached a level where it is functioning well, in line with the purpose for which it is being implemented, sit able and comfortably.

3. The deficiencies or defects in the project are not considered serious

4. Completion of work, defective work or repair of existing defects does not result in inconvenience to project owners and users

The procedure of issuing the Certificate of Practical Completion is the contractor is to give written notice to inform architect that the works are practically completed. Within 14 days of the receipt of the contractor's notice. Thus, the Certificate of Practical Completion (CPC) will be issued by the architect. Upon the issuance of CPC, the defect liability period (DLP) between client/developer and contractor will begin for twelve (12) months before the issuance of Certificate of Making Good Defect (CMGD) is made by the architect.

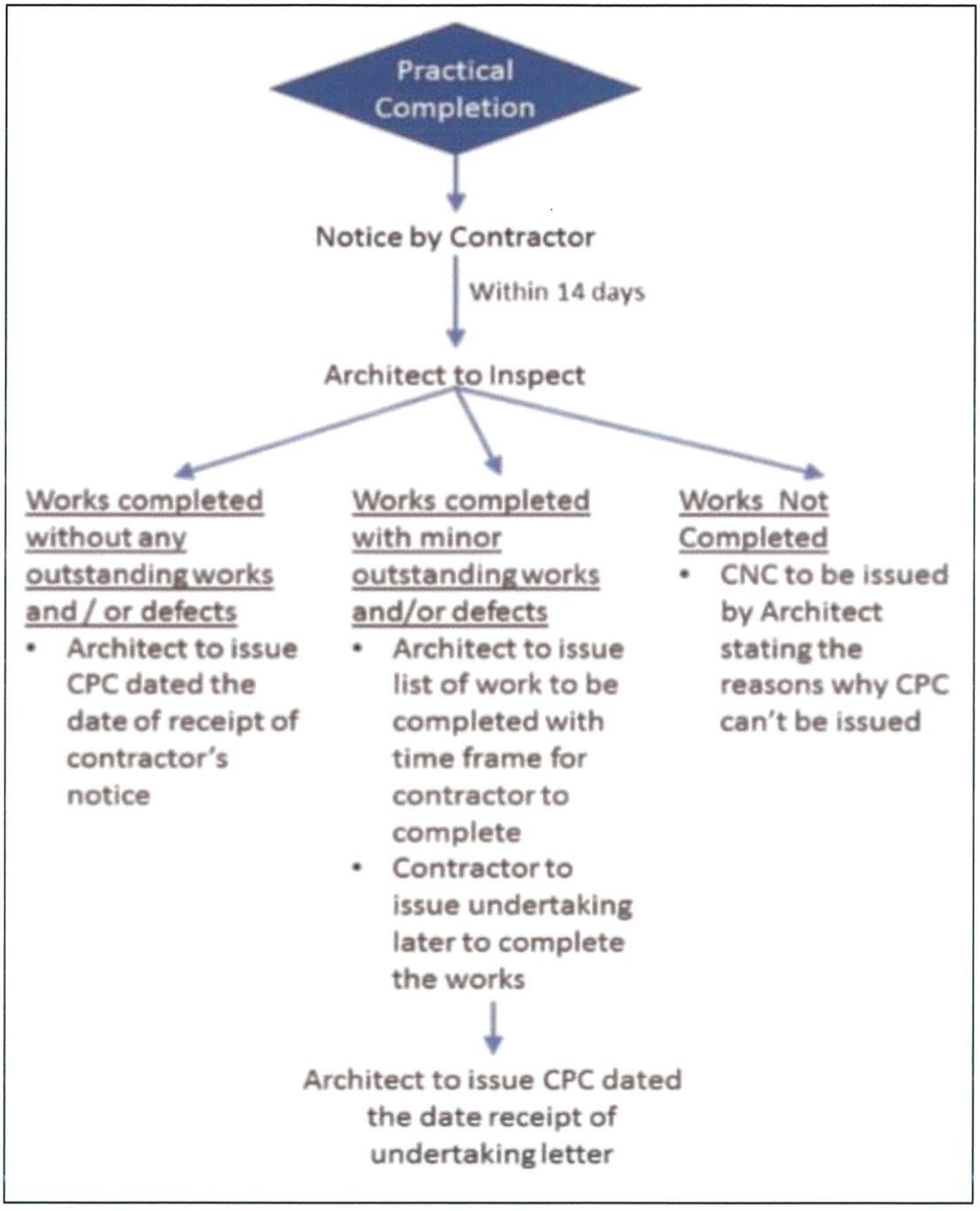
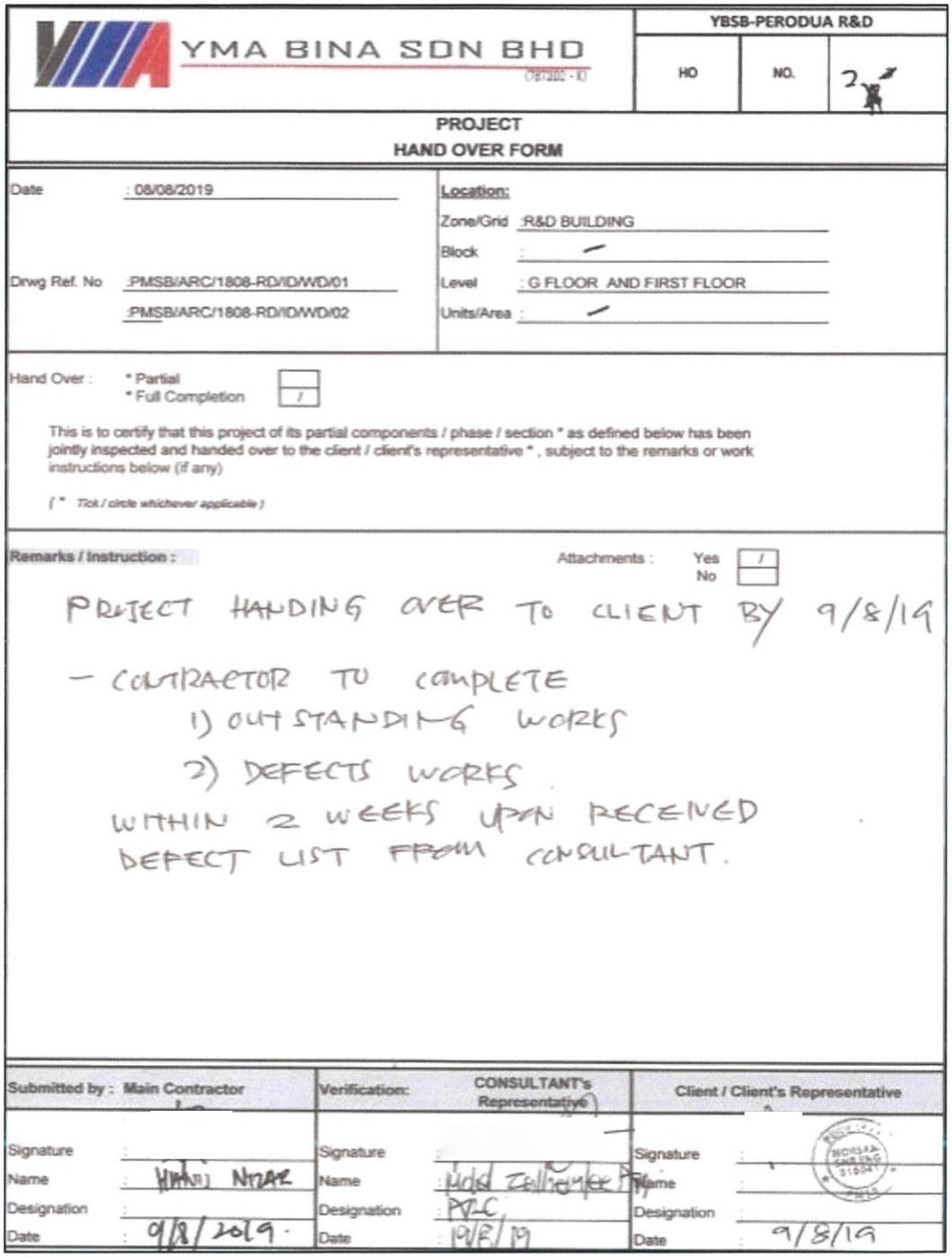


Chart 3.1: Flowchart of Issuing the Certificate of Practical Completion



YMA BINA SDN BHD

YBSB-PERODUA R&D

HO | NO. 2

PROJECT
HAND OVER FORM

Date : 08/08/2019

Drwg Ref. No :PMSB/ARC/1808-RD/ID/WD/01
:PMSB/ARC/1808-RD/ID/WD/02

Location:
Zone/Grid :R&D BUILDING
Block :
Level : G FLOOR AND FIRST FLOOR
Units/Area :

Hand Over : * Partial
* Full Completion /

This is to certify that this project of its partial components / phase / section * as defined below has been jointly inspected and handed over to the client / client's representative * , subject to the remarks or work instructions below (if any)

(* Tick / circle whichever applicable)

Remarks / Instruction : Attachments : Yes / No

PROJECT HANDING OVER TO CLIENT BY 9/8/19

- CONTRACTOR TO COMPLETE
  1) OUTSTANDING WORKS
  2) DEFECTS WORKS
  WITHIN 2 WEEKS UPON RECEIVED DEFECT LIST FROM CONSULTANT.

Submitted by : Main Contractor	Verification: CONSULTANT's Representative	Client / Client's Representative
Signature :	Signature :	Signature :
Name : [illegible] NIZAR	Name : [illegible]	Name :
Designation :	Designation : PQC	Designation :
Date : 9/8/2019	Date : 9/8/19	Date : 9/8/19

Figure 3.8: Example of Hand-Over Key Form

3.3.2 Defects liability Period (DLP) Begins

The DLP will begin when the works have been completed practically and have issued the Certificate of Practical Completion (CPC). From time to time during the DLP, the client is advised to report any defect to the architect. It is up to the client to handle this complaint whether it is appointing a special officer for this purpose or involving a building occupant making a complaint through the complaint form.

Architect will filter out defects that need to be repaired immediately and subsequently issue written instructions to the contractor for the defect to be fixed. For defects that do not need to be repaired immediately, they will be listed in the defective schedule as shown in table 3.1 and 3.2 that will be submitted after the expiry of the defective liability period. (Mohd Nazir, 2016)

Table 3.1: Example Schedule of Defects Issued by Consultant

PROPOSED RENOVATION PF EXISTING R9/10/2019 BUILDING-FINAL INSPECTION ON 19/08/2019

ARCRADIUS SENDIRIAN BERHAD

JOB NO:		DATE OF ISSUE:	27/8/2019	DEFECT LIABILITY END DATE	8/8/2019
JOB TITTLE	ROPOSED RENOVATION PF EXISTING R&D BUILDING	COMPLETION DATE:	9/8/2019	DEFECT LIABILTY PERIOD (IN MTHS:	12 MONTHS

Consultant:	Ar Mohd Zulhemlee An/ Muhammad Sardi Saad	Signature:		Date :	
Client:	En Mohamad Norsam bin Md Arof	Signature:		Date:	
Contractor:	En Mohd Anuar bin Said	Signature :		Date:	

ARCHITECTURAL WORKS

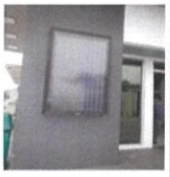
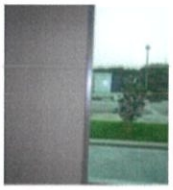
NO	LOCATION OF DEFECTS	DESCRIPTION OF DEFECTS	PHOTO OF DEFECTS		ACTION BY	DATELINE	SIGN OFF & DATE	REMARKS
			BEFORE	AFTER				
1	Security Building - External	Floor tiles to be in gradient to match the ramp at entrance			YMA			DONE
2	Security Building - External	LED display panel has not been installed yet			YMA			DONE
3	Security Building - External	External wall painting not even and transparent			YMA			DONE

Table 3.2: Example Schedule of Defects Issued by Consultant

PROPOSED RENOVATION PF EXISTING R9/10/2019 BUILDING-FINAL INSPECTION ON 19/08/2019

ARCRADIUS SENDIRIAN BERHAD

NO	LOCATION OF DEFECTS	DESCRIPTION OF DEFECTS	PHOTO OF DEFECTS		ACTION BY	DATELINE	SIGN OFF & DATE	REMARKS
			BEFORE	AFTER				
4	Security Building - External	All rain water down pipes to be provided with brackets fixed to the wall.			YMA			DONE
5	Security Building - External	Gutter brackets rusty and to be re-painted.			YMA			DONE
6	Security Building - External	Aluminum frame and fixed glass panels dirty and to be cleaned.			YMA			DONE
7	Security Building - External	Exposed electrical cables to be terminated and removed			YMA			DONE

The number of defects complaints can be issued without limits as long as it is still within the DLP. The contractor to be in charge in of making good all the defects work within two (2) weeks or 14 days after receiving the list of defects from the consultant as may agree in the contract. (Mohd Nazir, 2016)

Notwithstanding the architect may at any time during the DLP issue an instruction requiring any critical defects which need urgent rectification to be made good within a reasonable time specified by the architect at the contractor's cost.

3.3.3 The End of Defect Liability Period

When the liability period expires or is about to expire, another joint inspection is carried out with the contractor, consultants, client, and other parties involved will be conducted in light of the written instructions issued previously.

In the event of a defect, the defect is listed in the schedule of defects and submitted to the contractor for repairs. This schedule of defects must be submitted to the contractor within 14 days after the expiry of the defective liability period. If the schedule submitted after this period, the client's right to such defective will be terminated. This schedule also needs to be complete because the schedule of defect can only be issued once after this period. Therefore, a joint inspection must be performed so that any defects that are present can be remedied within the contractor's responsibility to correct them.

An inspection is required by the architect. While the contractor is repairing the defect listed in the defective schedule. This is for the contractor to perform the repair work properly and the work can be completed in no more than 3 months.

Once all defects have been properly repaired and it is determined that there is no defect, the Certificate of Making Good Defect (CMGD) must be issued by the architect and submitted to the contractor.

If the contractor fails to attend to the defects as directed by the architect or as listed in the Schedule of Defects within the allotted time, the repair work may be carried out in such manner as the architect may deem fit. For example, architect asks another contractor to fix it. All expenses involved should be deducted from the remaining unpaid contractor's money. If the balance is insufficient, the amount may be derived from the performance bond or calculated as contractor debt to the client. (Mohd Nazir, 2016)

Certificate of Making Good Defects (CMGD)

Procedures:

1. Schedule of Defects to be issued by architect not later than 14 days after the end of Defects Liability Period.
2. Contractor to complete defects rectifications within 28 days from receipt of Schedule of Defects from architect.
3. Upon completion contractor shall give written notice to inform Architect of the completion of defects rectifications.
4. Within 14 days of the contractor's written notice:
   i. The architect to issue Certificate of Making Good Defects dated on the day the written notice is received from the contractor.
   ii. Architects give written notice to the contractor stating reasons for non-issuance of the CMGD.

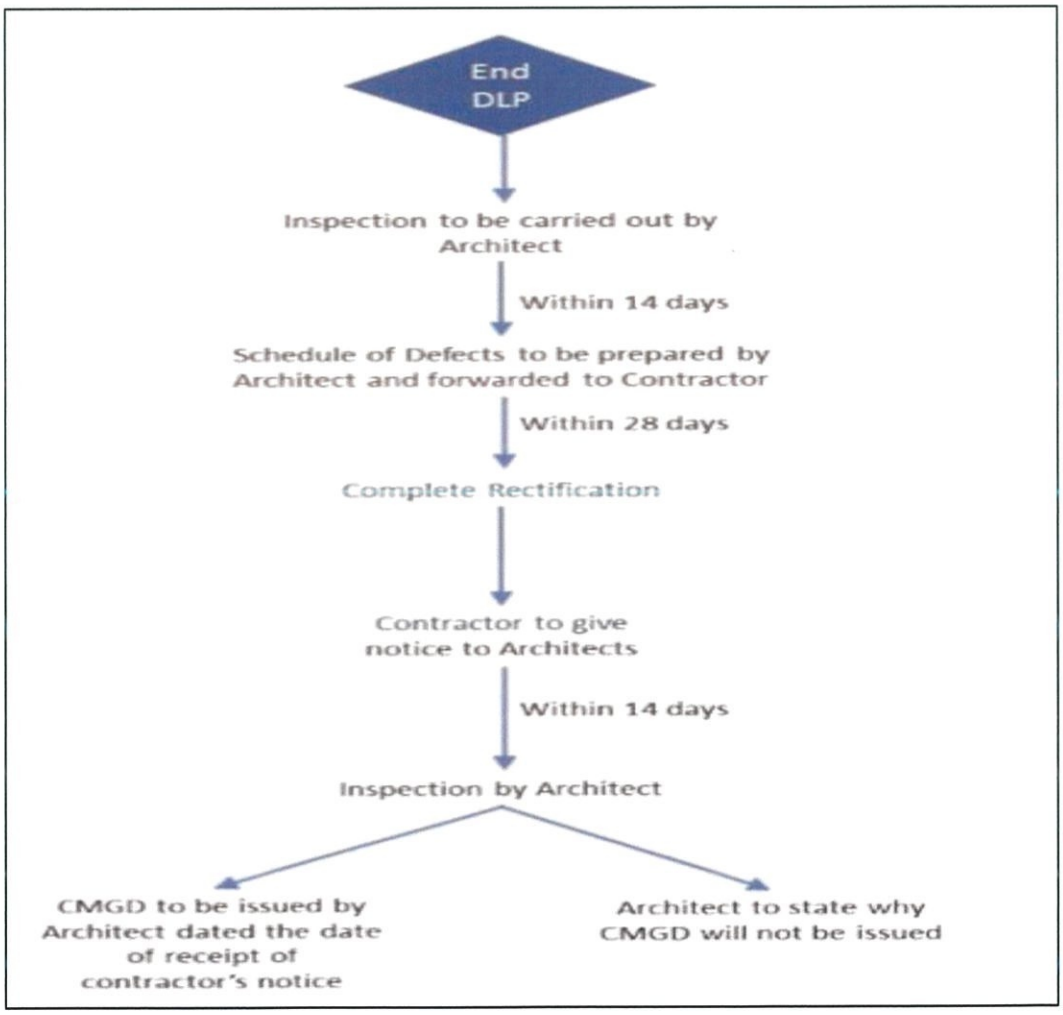


Chart 3.2 Flowchart at the End of DLP

The conclusion is, the CMGD indicates that the contractor has discharged his responsibility specifically for the defect and restated his contractual obligations in general. In other words, the CMGD marks the completion of the contractor's responsibility for a specific contract in the matter of repairing the defect and enabling the contractor to receive the final payment.

3.4 To investigate the problem and solution of the defect in the construction site.

3.4.1 Problem

Figure 3.9: Gutter Brackets Rusty

The problem occurs due to exposure to direct sunlight and rain which makes the gutter rusty with the presence of water and oxygen into contact with iron as figure 3.9. With using metal guttering, rust comes with the territory. Once it develops on any surface, the corrosion can eat through the gutters. Gutter rust can even form large holes, coupled with the action of leaf acids which also weakens the structure and leaking rusty gutters stains paths.

Solution

Figure 3.10: Re-Painted Gutter Brackets

The solution is the rusty gutter brackets are to be re-painted shown in figure 3.10. The gutter should be painted on a generous coat of rust-neutralizing primer and allow it to dry completely.

3.4.2 Problem

Figure 3.11: Exposed Electrical Cables

The problem occurs due to improper installation by the sub-contractor. The cable can cause passer-by saddled. Electrical cabling becomes unsafe if the bare wires are exposed as shown in figure 3.11 and they rub or strain against structural steel framing or other rough edges. Nails, screws, and pests can also damage cabling, which can lead to electrical faults, shocks or fires. It is very important to make sure that electrical installations and fittings are isolated from people.

Solution

Figure 3.12: Cables to be Removed

The solution is the exposed electric cables are wrap up neatly with electrical tape until the wires are safely covered. Other than that, the cables either to be terminated or removed from the drain as shown in Figure 3.12.

3.4.3 Problem

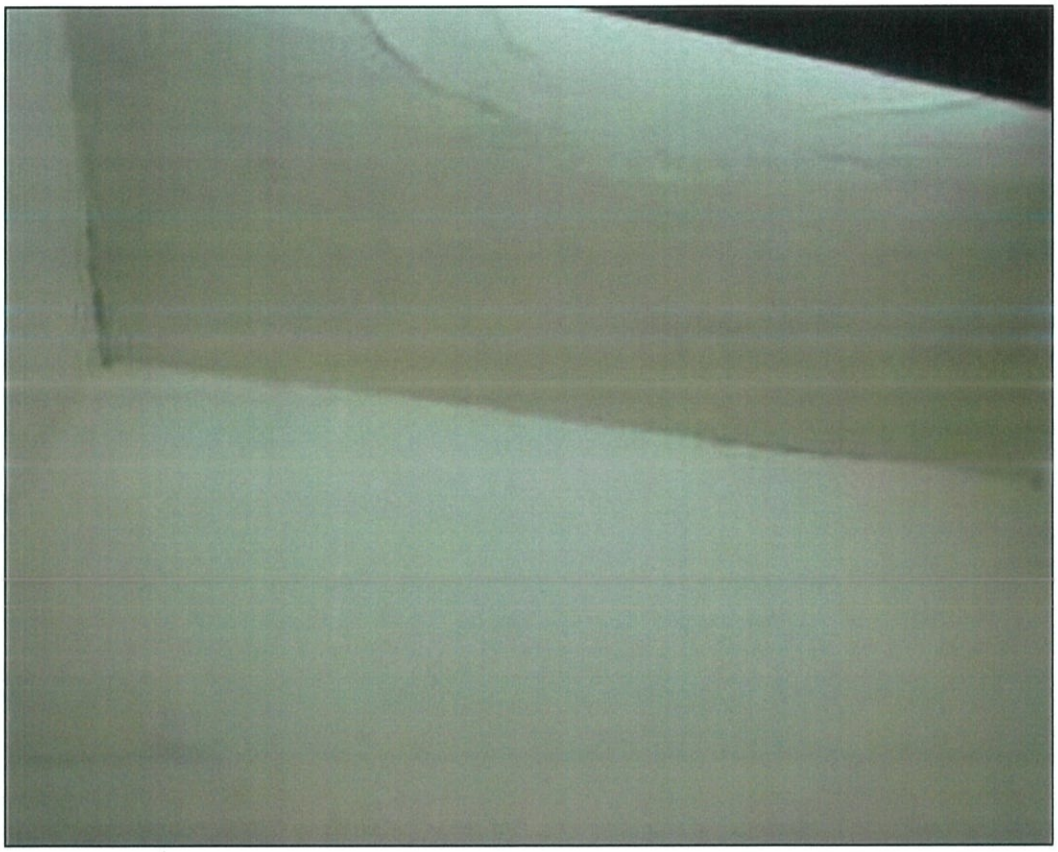


Figure 3.13: Ceiling Surface Rough and Painting Not Even.

The problem occurs with the faults of the main contractor. It is because during the painting works, the main contractor does not observe the surface of the ceiling either it is okay to proceed with the painting works or not likes figure 3.13.

Solution

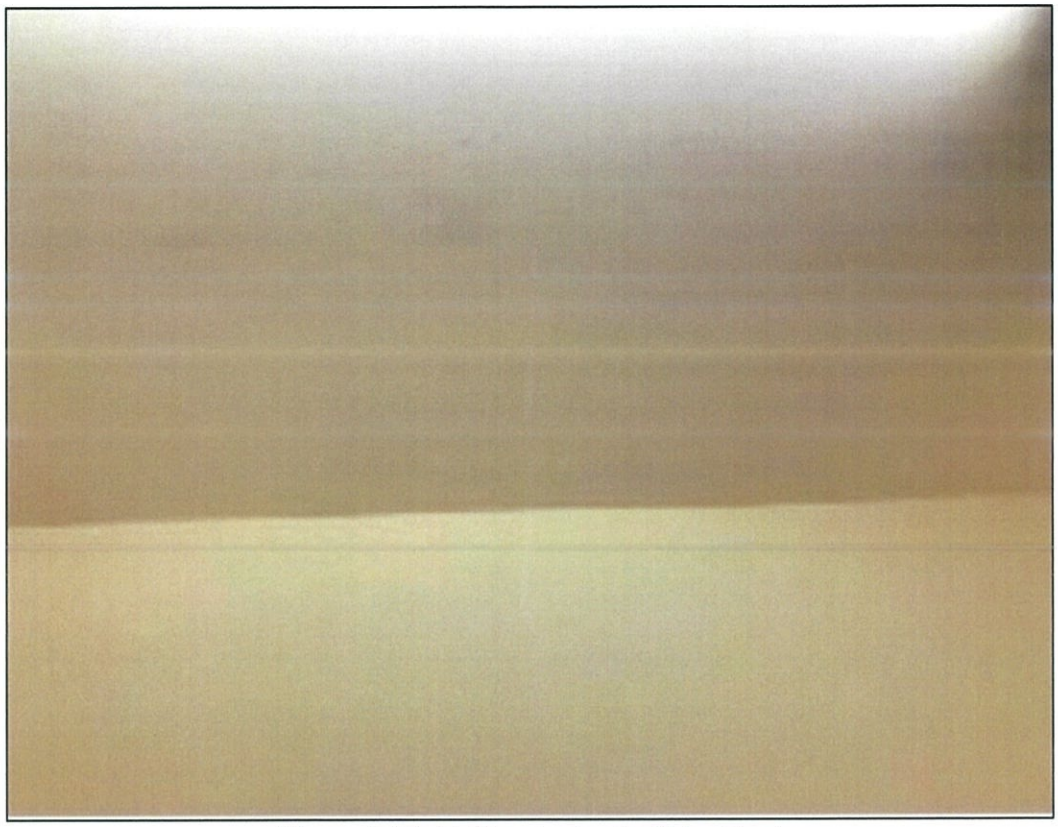


Figure 3.14: Ceiling to Apply Skim Coat

The solution is the ceiling to apply skim coat before re-painting the ceiling, as shown as figure 3.14. This type of textured ceiling involves cleaning and prepping the existing substrate with quick-set drywall mud, applying a bonding agent like a joint compound, and then applying a finishing compound with a trowel or knife to create a new texture. For the skim coat, use a quick-set drywall mud, then touch it up with a ready-mixed joint compound. If we use a ready-mixed material as the base, it has higher moisture content and contains silica, which is prone to causing some shrinkage, affecting the final look.

CHAPTER 4.0

CONCLUSION

4.1 Conclusion

At the end of this report, all three (3) objectives which are the common type of defects in construction, the process of Defect Liability Period (DLP) and the problem and solution of the defect in the construction site are completely achieved. There are many types of defects in construction, but the writer only highlights four (4) common types of defects that always occur in construction. As for DLP process, the writer now learns more deeply what happens after the handing-over process in construction and now was able to identify the causes and solution for the defects occur.

Construction failure can be associated with defects and shortcomings during the project implementation process of construction projects. However, frequently parties managing construction projects are somewhat unmindful of the defects and their causes, and thereon take the necessary action if and only if when they happen. Most defects are not properly recorded and resolved, and an end, this frequently results in significant cost overruns.

In a nutshell, occurrence of defects in construction will leads to lowering the satisfaction of the customers, to stand and progress reputation in market, customer-oriented construction of buildings needs to be constructed to improve the quality and service to the end users. The most important reason is poor workmanship they do not follow the instructions which was given in the specifications also responsible for the occurrence of defects. Inspection of work is necessary for a building at a particular interval of time throughout the life of building. The lack of maintenance or incorrect maintenance will lead to reduce the life of the building and also reduces the effective life of the materials far lower than it should be achieved.

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