



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

**BUILDING MAINTENANCE PROCESS DURING
DEFECTS LIABILITY PERIOD**

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(PERAK)**

AUGUST 2021

It is recommended that the report of this practical training provided

By

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entitled

**BUILDING MAINTENANCE PROCESS DURING
DEFECTS LIABILITY PERIOD**

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

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(PERAK)**

AUGUST 2021

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 Setiakon Builders Sdn. Bhd. for duration 20 weeks starting from 1st August 2021 and ended on 7th January 2022. It is submitted as one of the prerequisite requirements of BGN 310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

.....
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ABSTRACT

The primary goal of this study is to identify the building maintenance procedure performed by Setiakon Builders Sdn. Bhd. throughout the defect liability period (D.L.P.) with reference to their projects. In this work, a variety of case study techniques were employed to gather and analyse data. This includes doing a site visit and interviewing Setiakon Builders Sdn. Bhd. employers and employee, such as their site supervisor, as well as their client, Thriven Global Berhad. Extracted data from books, theses, the internet, and forms relating to the building maintenance procedure throughout the Defect Liability Period (D.L.P.) were also used in the research. The overall conclusion of the case studies demonstrates that construction faults develop often in the absence of effective building care. This article discusses how to handle building maintenance throughout the defect liability period in a more effective and efficient manner. This helps to guarantee that the building maintenance procedure is organised and efficient during the works. It gives excellent knowledge in addressing building defects for academics. This study will most likely serve as guidelines for managing building maintenance throughout the period in the future. This study expands on previous studies and has ramifications for Setiakon Builders Sdn. Bhd. efforts in managing building maintenance during the Defect Liability Period (D.L.P.). It provides essential information and instructions that, ideally, will assist other contractors and developers in doing better building maintenance management

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

Defective building works can be caused by a variety of circumstances, including poor design, inferior materials, insufficient oversight, bad craftsmanship, or other types of negligent construction. Defective building works have negative consequences and consequences for all parties concerned, and it has been discovered that poor craftsmanship can result in a long list of flaws.

In a typical contract, the contractor is responsible for carrying out and completing the construction work, which includes providing the craftsmanship and materials specified by the architect and engineers. The contractor must conduct and complete the work in full compliance with the contract terms, which typically include drawings, specifications, and the building code, within the specified time frame.

The contractor's primary responsibility in terms of quality of work is to adhere to the contract's conditions. In most formal building or engineering contracts, the contractor has an initial stated commitment to carry out and finish the job in line with the contract. In reality, there are two duties here: to carry out and complete the tasks.

The contract conditions comprise both stated terms (such as the need that work meet the standards outlined in the invoices) and inferred terms (such as the notion that all materials must be of acceptable quality). Contractors frequently feel that their obligation is limited to what is mentioned in the contract, which is a critical misunderstanding. There are several categories of contractual obligation that are both implied and explicit. In practise, this implied contractual duty might be the contractor's responsibility to complete its task in a professional way. As a result, even when dealing with contractual obligation, the contractor is frequently subject to a scope of liability that differs from, and is typically more broad than, the stated contract.

A contractor impliedly commits to conduct work and provide materials under a construction contract, which includes completing the task with care and skill or, as commonly described, in a workmanlike way. The contractor must also employ high-quality materials. This will imply good of their declared sort and free of flaws in the case of materials described specifically. There will be reliance on the contractor to the extent that goods are not described, or are not described in sufficient detail, and the warranty that both the workmanship and materials will be reasonably fit for the purpose for which they are required, unless the circumstances of the contract are such as to exclude any such obligation. This obligation is in addition to that of working in a workmanlike manner, and will only become relevant, for practical purposes in any dispute, if the goods are not described, or are not described in sufficient detail.

There is express reference to substantial completion or practical completion informal style contracts, which are often used as definitions informal contracts to donate at the beginning of the maintenance or defect liability period, in addition to the principal express or implied obligation to complete the construction. This is also important for securing the contractor's release of the first share of any retention funds. In general, these statements refer to a condition of seeming completion free of known faults that allows the employer to occupy and utilise the project, so ending any potential contractor obligation for liquidated damages for the delay. The concept of this sort of contract envisions the beginning of a time when the employer takes possession, but at the conclusion of which the contractor will make good any known omissions or flaws.

The contractor's liability, duties, and responsibilities do not end with the contract. There are some that are more inclusive. Liability may fall within the category of torts. Although the contract may state that the contractor must act properly, or even if the contract does not state it, tort law does. Under tort law, everyone owes everyone else the duty to act with reasonable care and competence. This responsibility extends beyond the contracting party and encompasses all individuals. As a result, even if the contractor is meeting his contractual commitments, he may be held accountable for his failure to use reasonable care in the execution of his duties. It may be argued that a contractor who follows his or her contract invites potential culpability.

Most typical forms of building or engineering contracts in the construction sector have clauses that deal with faulty works, which might be in the form of a design flaw, defective building materials, or poor workmanship. It is not possible to say that the work has been practically finished in a construction contract if the work is so faulty that it prevents the owner from utilising the building as envisaged under the contract.

The Defect Liability Period (DLP) is a basic provision of all Malaysian construction contracts, including Pertubuhan Arkitek Malaysia (PAM) 2006, Public Work Department (PWD) 203A (Rev.2007), Institution of Engineer Malaysia (IEM), and the Construction Industry Development Board (CIDB) 2000. During the DLP, the contractor is responsible for correcting any deficiencies that arise between the time the Certificate of Practical Completion (CPC) is obtained and the DLP13 expires. Patent faults and latent defects are the two types of defects that can be found. During the defects liability period, patent flaws can be identified by routine examination or testing, but latent defects are hidden by their very nature and may not emerge for many years.

Although each contract will be unique, broad basic categories of contracts may be defined, and even a contract tailored to fit the special needs of a given circumstance will undoubtedly have aspects in common with other contracts. The DLP provisions are incorporated in the typical forms of building contracts under few clauses such as PWD 203A 2007: Clause 48 – Defects Liability and Making Good and CIDB 2000: Clause 27 – Defects Liability after Completion.

As a result, the contractor is accountable for the faulty works under the contract and has the right and obligation to return to the job site to correct the faults during the defect liability period. Before employing another contractor to correct the problems, the employer must give precedence to the ordinary contractor. The ordinary contractor who is accountable generally does the repairs at a lower cost and with more efficiency than the employer who hires a third party to do so.

1.2 Objectives

The objectives of this report are :

- 1) To identify if the contractor is not accountable for any defect, imperfection, shrinkage, or other flaw that occurred during the defect liability period.
- 2) To investigate the tools and equipments used during the defect liability period.
- 3) To repair those defects in the general obligation to complete the works to the required standard.

1.3 Scope of Study

For this practical report, the Defects Liability Period for construction of 2 blocks of the apartment at the Lumi, Tropicana. This site was located at Petaling Jaya, Selangor. In this project, the writer will discuss cases related to defective building works during defect liability. This time begins immediately upon the conclusion of the construction project. The quality of the job is evaluated and rated during this phase to see whether there are any problems or places for improvement. The defect liability period usually begins when a project reaches practical completion.

1.4 Method of Study

This report may be researched using a variety of approaches. Interviewing straight from the research question with a small group of individuals is the sort of approach used by a researcher. Furthermore, some of the many approaches for educational research, such as observation, might represent diverse perspectives in legal theory. This article contains a comprehensive assessment of the most generally used methodology, which compares and contrasts the merits and shortcomings of various approaches.

1. Interviewing

Employers value interviews because they allow them to learn more about you and your experience. Many businesses utilise interviews to evaluate if applicants have the necessary abilities and experience to thrive in the industry, as well as to see if they would fit in with their organisation. Because most construction professions need the use of specific equipment and processes, you may want to highlight your experiences that will help you in your construction career during your interview. You may also utilise an interview to show off your personality and explain why you believe you'll be successful in the job you're looking for.

2. Observation

The importance of observation in the learning process cannot be overstated. In most cases, I'll be with my inspector or other employees as part of my internship programme. Its purpose is to keep many stakeholders up to date on progress. A site observation may be shared with planned subcontractors and contractors to assist them understand what's going there, and it will almost likely be shared internally to keep functions and teams in sync.

3. Reviewing Documents

The construction documentation themselves have not changed significantly, but the technology for developing, maintaining, publishing, and disseminating such records has. It will give a complete literature study on the stages of document management system use in the construction sector by reviewing them. The research for this report summarises the issues related to the defect liability period in construction that were gathered from the internship program's company, and while the internet provides easy access and secure storage for project documents and information, there are a few issues with using these systems effectively.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Incorporated on 12th December 1994, Setiakon Builders Sdn Bhd (Setiakon) started off as a sub-contractor, focusing mainly on building and infrastructure works. Some of the notable projects completed were Putrajaya's Dataran Putra, Customs, Immigration & Quarantine Complex at Tanjung Kupang Johor and Kuala Lumpur Flood Mitigation. From a humble beginning, Setiakon has grown and become a main contractor completing residential projects in Klang Valley and Johor. Setiakon strives to consistently ensure the projects are successfully delivered on time, within the budget and not compromising on the quality. Based on our track record in completing residential, commercial, industrial and infrastructure projects coupled with a team of experienced and highly skilled personnel, Setiakon is positioning itself to be a prominent construction company.

The company is entering its third decade of operations. Backed by a proven track record, we have been leveraging on our extensive experience across the spectrum of the construction industry to deliver the best-in-class performance and benchmark-setting projects. While our unwavering commitment to being a reliable, proactive and focused industry player has not changed, we are equally committed to making changes that will bring us to the next level. Changes come in many forms: better operational efficiency, heightened site supervision, more comprehensive training and better financial control, to name just a few.

2.2 Company Profile



Figure 1: Logo of Company

Table 1 : Company Details

Company Name	Setiakon Builders Sdn Bhd
Established Date	12th December 1994
Registration Number	1970411-SL028346
CIDB Grade	G7
Paid Up Capital	RM 10,000,000.00
Physical Address	No. 13, Jalan Cempaka SD 12/1, Bandar Sri Damansara, 52200 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur
Phone Number	+603 - 6273 5963
Email Address	info@setiakon.com.my
Website URL	www.setiakonbuilders.com.my

Setiakon Builders Sdn Bhd (Setiakon) has been a part of the phenomenal development propelled by efforts to build a better world. It is indeed amazing the way possibilities are turned into realities by something well-built. As a trusted contractor, we have contributed to this growth through our successful involvement in a wide range of local and overseas construction projects. In so doing, we have also built our name, our track record and our clientele over two decades. It is our goal to provide the best possible construction solutions to realize our client's unique vision. This would mean completing tasks covering a full range of scope and levels of

difficulty. However well executed, a building project must serve its purpose. We take effective client-contractor communication seriously to ensure a clear understanding of our clients' needs and avoid uncertainties that may hinder progress.

Keeping values top-of-mind and putting our clients interests first, we implement best practices and work closely with all of our supply chain, resulting in fruitful long-term working relationship with all parties concerned. No task is too small for our full attention. We organize each and every aspect of the building process, concentrating on a wide range of duties and responsibilities both on-site and off-site. Taking a proactive stance not only enables us to meet critical deadlines at each stage, but also helps minimize site incidents and hazards, maximize efficiency and handle unexpected situations wisely and correctly. We troubleshoot and resolve issues swiftly after careful considerations to ensure the projects are delivered in a timely, cost efficient and resource efficient manner. This helps us to respond quickly or act fast in situations where timing is of utmost importance.

Today, Setiakon is a leading contractor in Malaysia with a completed and current portfolio of residential, retail, healthcare, institutional, commercial, industrial and infrastructural projects. Having completed billions of ringgit worth of projects, Setiakon remains the trusted construction company that keeps our clients' projects progressing smoothly, safely, on time and within budget.

2.3 Company Organisation Chart

An organisational chart is an essential part of every construction company. It provides everyone in the firm with a visible hierarchy of corporate positions and indicates who is in charge of making decisions inside the organisation. Creating a flow of responsibility may assist you in making wise decisions, empowering your staff, and removing bottlenecks. In this post, we'll look at some of the most popular positions in the construction industry and how they normally fit into an organisational chart. We'll also look at some real-world instances of org charts.

Almost every construction company is likely to be the same. For Setiakon Builders Sdn Bhd the organizational chart is divided into two, whether they are located in our headquarters or site. However, most businesses are structured in a similar manner. The responsibilities of these levels, like those of the various divisions, have nothing to do with the size of the firm. A large corporation may have numerous individuals in each tier, but a small company may delegate multiple tasks to a single person.

On site, the Project Manager handles important customer projects. The coordination and execution of projects on schedule, within budget, and within scope are among the responsibilities of project managers. Project management entails overseeing all areas of a project. Set deadlines, assign duties, and track and report project progress. Prepare status reports for senior management on the status of the project.

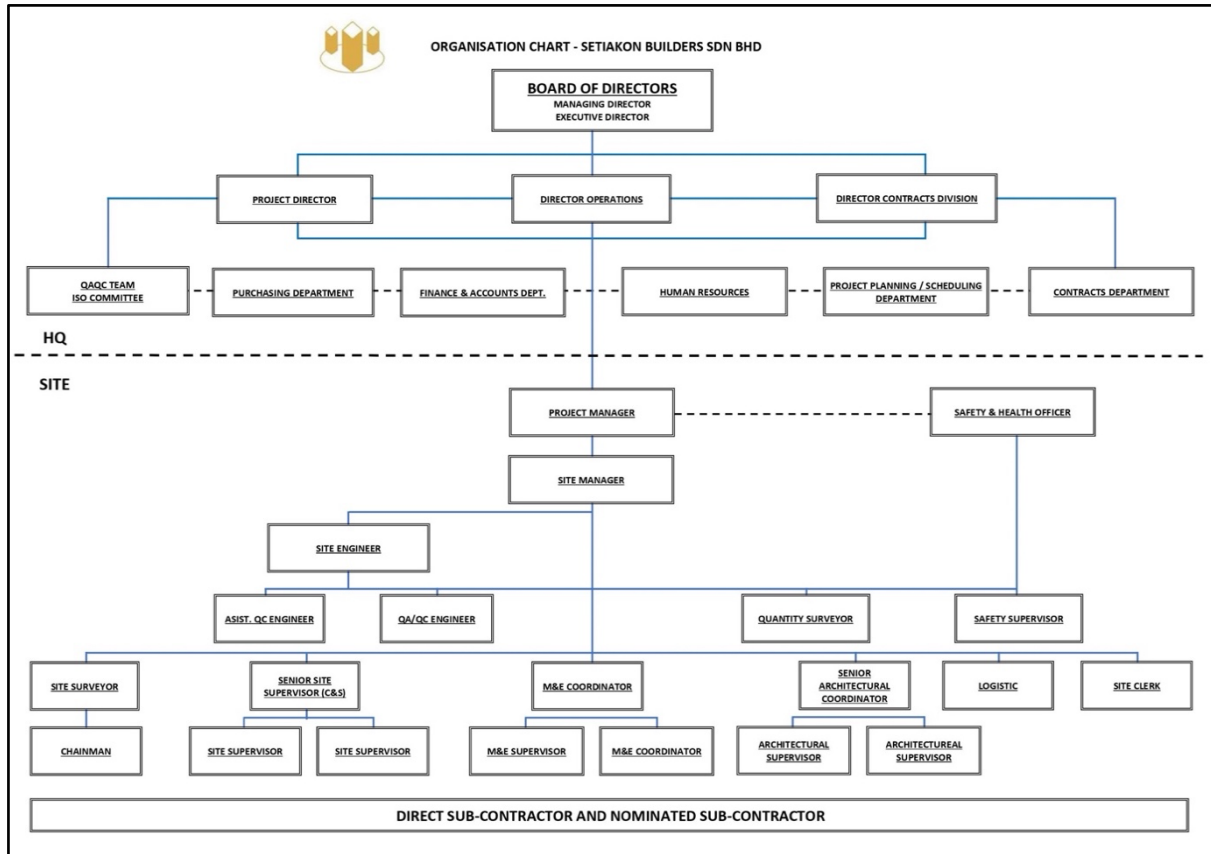


Figure 2 : Organisation Chart

2.4 List of Projects

2.4.1 Completed Projects

The date of completion of all improvements required for the start-up, location, or growth of the business within the community is referred to as Project Completion.

Table 2 : Completed Projects

No.	Project Title	Project Value (RM)	Completion Date	Client
1.	Cadangan Pembangunan 1 Blok Pangsapuri Servis/Soho 50 Tingkat Di Atas Lot 242, Seksyen 63, Dalam Bandaraya Kuala Lumpur Basemen & Podium Carpark, Main Building Works And External Works	240,038,000.00	June 2020	I-Marcom Sdn. Bhd.
2.	Cadangan Pembangunan 1 Blok A Pangsapuri Servis 33 Tingkat (225 Unit) Di Atas Lot 36464 Dan Lot 36465, Mukim Petaling, Daerah Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur	176,800,000.00	January 2020	Skyluxe Development Sdn. Bhd.
3.	Cadangan Pembangunan Komersial Di Atas Lot 11541, 11527, 11528, 11532, 11529 & PT464, Jalan Ampang Ulu 3, Mukim Ampang, Kuala Lumpur Untuk Tetuan Pihak Berkuasa Kemajuan Pekebun Kecil Perusahaan Getah (RISDA)	277,500,000.00	July 2018	Nusmetro Ampang Sdn. Bhd.

2.4.2 Project in Progress

A project in progress is one that has not yet been finished and is still under construction. Currently, we have few project is in progress.

Table 3 : Current Projects

No.	Project Title	Project Value (RM)	Completion Date	Client
1.	Cadangan Membina Pembangunan Perniagaan Yang Terdiri Dari Fasa 2 - 2 Blok Pangsapuri Perkhidmatan 35 Tingkat Blok A2 186 Unit Dan Blok B2 186 Unit Di Atas Lot 212 Dan Lot 213, Persiaran Tropicana, PJU 3, Mukim Damansara, Daerah Petaling, Selangor Darul Ehsan	120,350,728.51	Jan 2022	Mayfair Ventures Sdn. Bhd.
2.	Cadangan Pembangunan 2 Blok Bangunan Pangsapuri Perkhidmatan 37 Tingkat (1018 Unit) Di Atas Lot 80916 dan Lot 32661, Jalan Segambut, Mukim Batu, Wilayah Persekutuan Kuala Lumpur Untuk Tetuan 368 Segambut Sdn Bhd	188,000,000.00	Jan 2022	368 Segambut Sdn. Bhd.
3.	Execution And Completion Of Cadangan 1 Blok Pejabat 48 Tingkat Di Atas Lot-Lot 402, 490, 507, 1215, PT 146, PT 149, PT 150 Dan PT 200, Seksyen 67, Jalan Delima, Jalan Utara Dan Jalan Kemuning, Wilayah Persekutuan Kuala Lumpur	168,800,000.00	Jan 2022	Pedoman Cekap Sdn. Bhd.

CHAPTER 3.0

CASE STUDY

3.1 Introduction of Defects Liability Period

The word 'Rectification Period' has taken the place of the term 'Defects Liability Period,' although the impact is the same. There is a defined period following the practical completion of the Works under the Main Contract, or the practical completion of the Sub-contract works under the Sub-contract, during which the contractor is required to remedy patent (i.e. defects that become apparent) defects in the works completed under the contract at its own expense.

Retention is often carried at half the percentage amount held prior to practical completion during the rectification period as insurance against the contractor failing to return to correct the errors in its work. When all of the deficiencies that arose during the rectification period have been fixed or made good, the Architect/Contract Administrator should issue a certificate to that effect, which will serve as a trigger for the final statement to be issued and the contract to be completed. In the case of a subcontract, it is the responsibility of the primary contractor to notify the subcontractor when all flaws have been corrected.

The main contractor will need to manage the process when sub-contract completion may occur and the rectification of the defects because the main contractor may find himself subject to a different timescale under the main contract, which may have a commercial impact on when retention monies are due. When placing subcontracts, this will need to be carefully studied.

3.1.1 Location Plan

Lumi Tropicana is the latest development to take place in the upscale suburban section of Tropicana in Petaling Jaya. This leasehold property is under the flagship of developer Thriven Global Berhad. Formerly known as Mulpha Land, a multi-property developer ranging from healthcare to hospitality, the restructuring was made due to a change in business strategy that aims to focus more on lucrative developments in northern and central Peninsula Malaysia. In line with the recent change in business objective, the idea for Lumi Tropicana was nurtured as an integrated development of serviced residences, SoHo suites and retail shopping outlets.



Figure 3 : Overview of the project

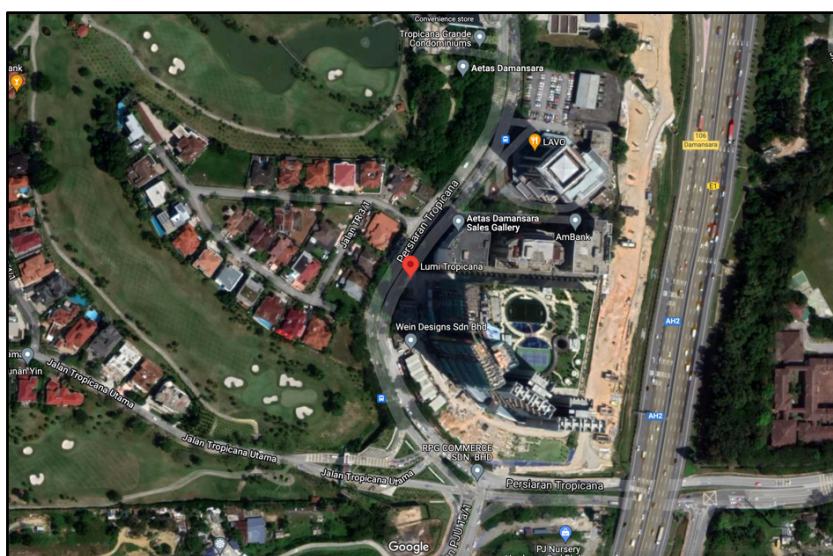


Figure 4 : Location of the project

3.1.2 Site Plan

A site plan is a combination of an architectural design, a landscape architecture document, and a comprehensive engineering drawing of proposed changes to a specific piece of property. A site plan often depicts the footprint of a building, as well as roadways, parking, drainage facilities, sanitary sewage lines, water lines, pathways, lighting, and landscaping and garden components. A graphic representation of the arrangement of buildings, parking, roadways, landscaping, and any other structure that is part of a development project is a site plan like this. A site plan is a diagram that depicts the set of construction plans used by a builder or contractor to make changes to a home. The site plan can be used by counties to verify that development codes are being followed as well as as a historical resource. A design consultant, who must be a professional engineer, architect, landscape architect, or land surveyor, is frequently used to create site plans.

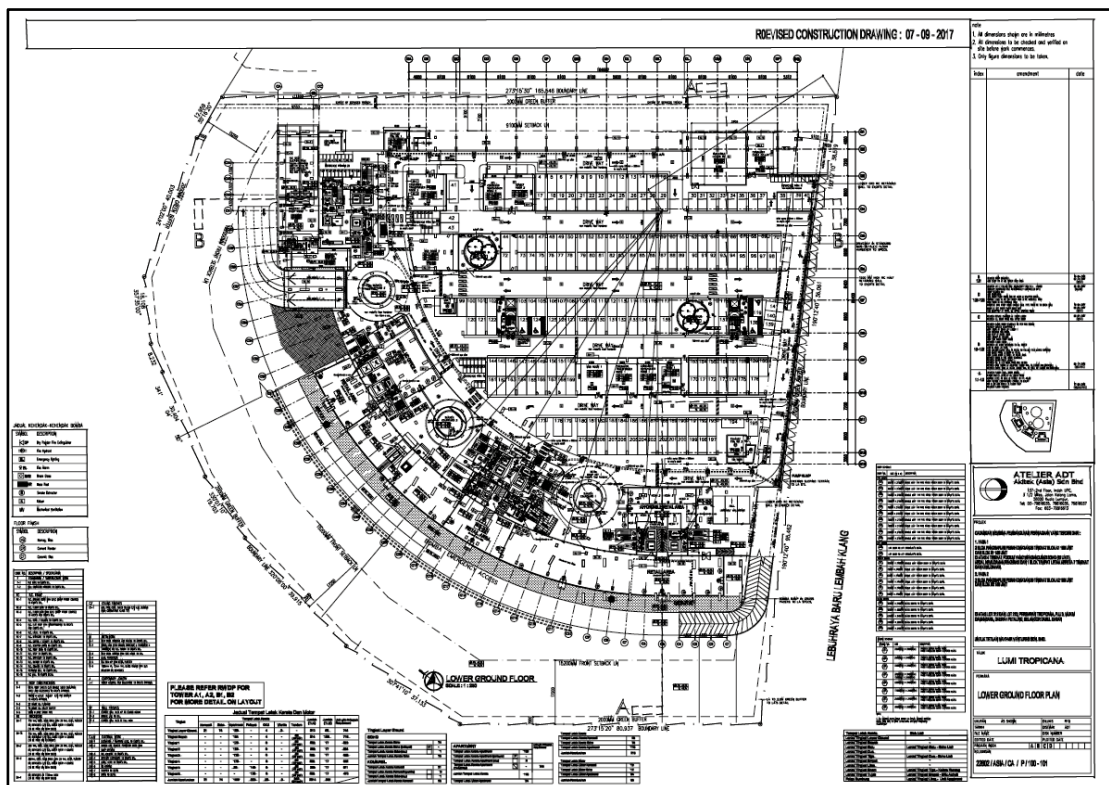


Figure 5 : Site plan of the project

3.1.3 Project View

The goal of the project view is to characterise the building's state from all sides and angles. The image below shows the project signboard and a front view of the project.



Figure 6 : Signboard of the project



Figure 7 : Front View of the project



Figure 8 : Front View of the project

3.1.4 Layout Plan

The ideal physical arrangement of all resources that occupy space within a facility is determined through layout planning. A desk, a work centre, a cabinet, a person, a complete office, or even a department could be among these resources. Decisions concerning the arrangement of resources in a business are made not only when a new facility is being planned, but also whenever there is a change in the arrangement of resources, such as the addition of a new worker, the relocation of a machine, or the implementation of a new procedure. Layout design is also done whenever there is a facility expansion or a space decrease.

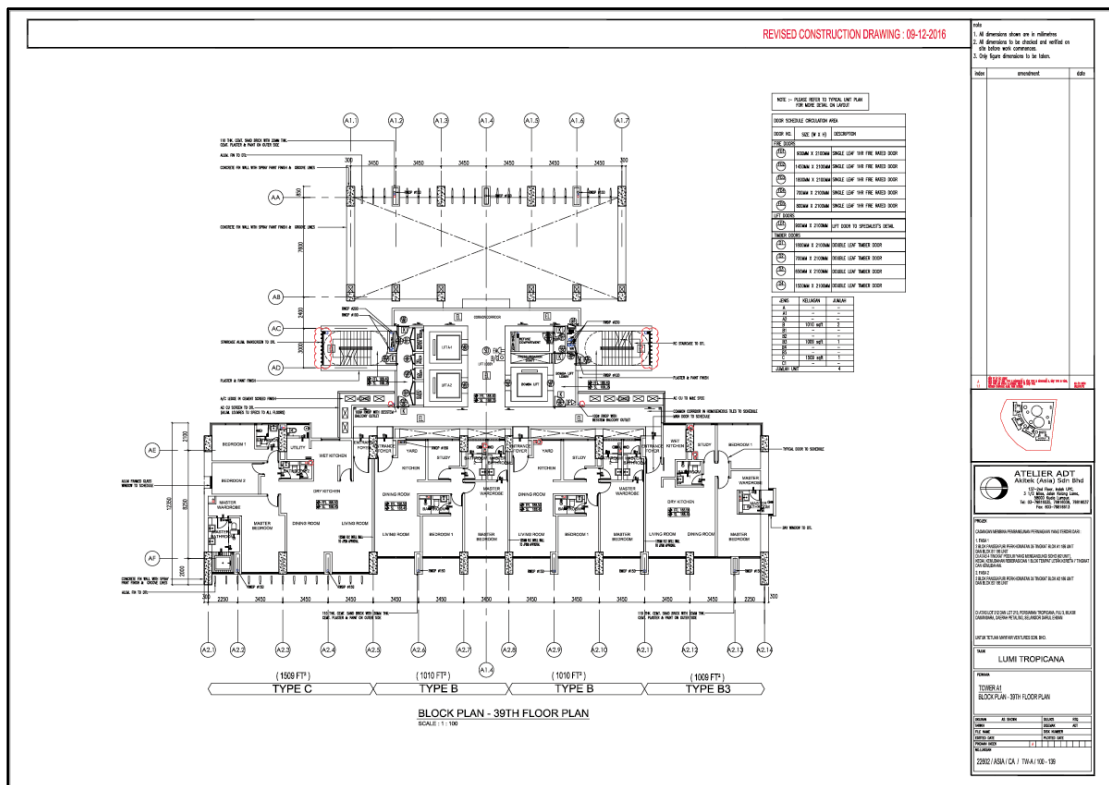


Figure 9 : Floor Plan for Level 35

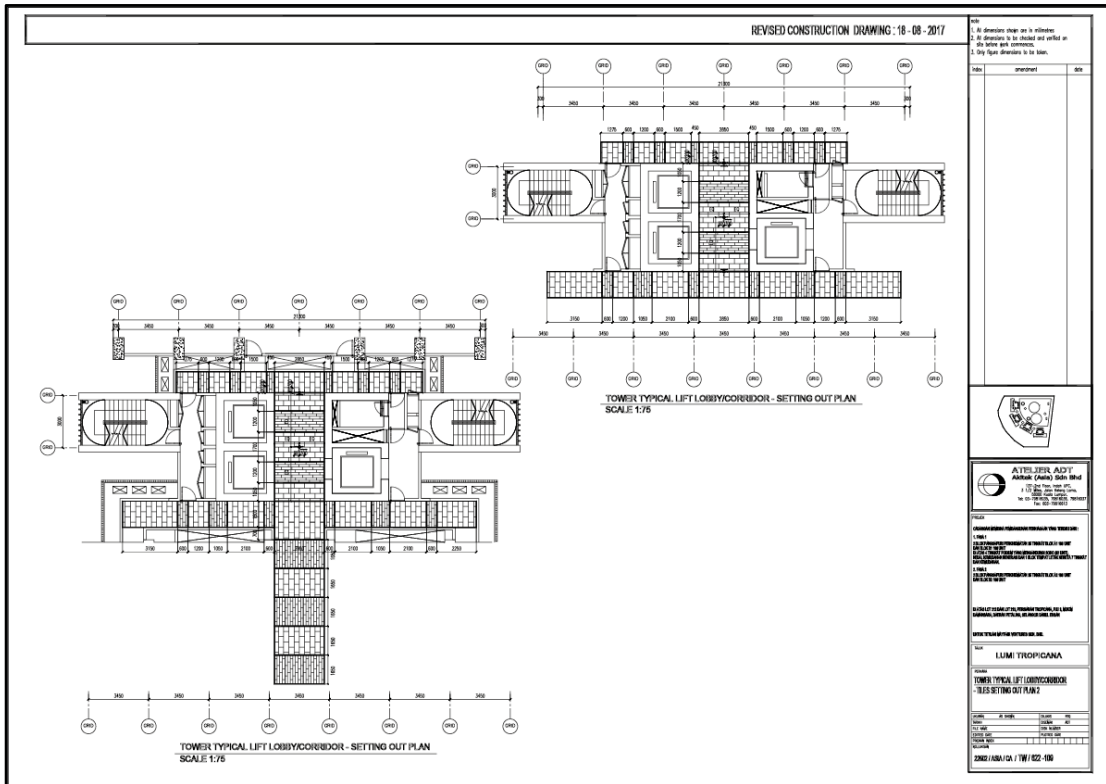







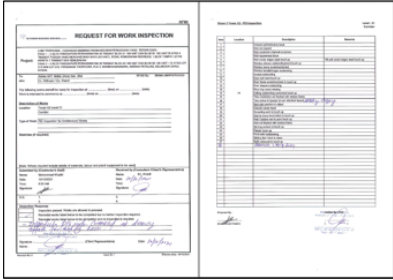
Figure 10 : Tiles Setting Out Plan for Level 35 Corridor

3.2 To Identify The Equipment Used For The Whole Period

i. Inspection





Table 4 : Equipment Used for Inspection Process





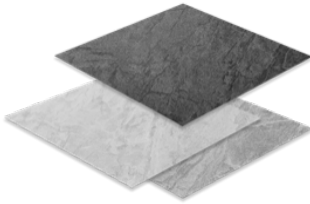
No.	Equipment And Tools	Function
1.	<p data-bbox="544 551 600 584">Pen</p> 	<ul style="list-style-type: none"><li data-bbox="807 678 1358 763">• To write down some notes and remarks in the inspection form.
2.	<p data-bbox="496 943 647 976">Marker Pen</p> 	<ul style="list-style-type: none"><li data-bbox="807 1070 1358 1155">• To highlights the defects for workers to rectify as per in the inspection form.
3.	<p data-bbox="488 1335 655 1368">Tapping Rod</p> 	<ul style="list-style-type: none"><li data-bbox="807 1462 1358 1547">• To identify the defects in tiles such as hollowness and leapage.

4.	<p>Measuring Tape</p> 	<ul style="list-style-type: none"> • To measure the dimension of wall, cabinets and placement of sanitary fittings in the house.
5.	<p>Smartphone</p> 	<ul style="list-style-type: none"> • To update the work progress. • Taking defects pictures for reports purposes.
6.	<p>Inspection Form</p> 	<ul style="list-style-type: none"> • To determine quality standards and product specifications, as well as objective criteria for assessing products and facilities. • To verify that they fulfil consumer and regulatory demands.

ii. Rectifying

Table 5 : Equipment Used for Rectifying Process

No.	Equipment And Tools	Function
1.	<p>Club Hammer</p> 	<ul style="list-style-type: none"> • Used for more difficult tasks like driving stakes or breaking up concrete, stone, or masonry.
2.	<p>Tiles Chisel</p> 	<ul style="list-style-type: none"> • To precisely breaking the tiles with sharp end.
3.	<p>Pail</p> 	<ul style="list-style-type: none"> • To mix the cement before laying tiles.
4.	<p>Trowel</p> 	<ul style="list-style-type: none"> • Small amounts of fluid or particle material are dug, applied, smoothed, or moved with this tool. • To apply adhesive when adhering tile, or laying synthetic floor surfaces.

5.	<p style="text-align: center;">Tiles Cutter</p> 	<ul style="list-style-type: none"> • Ceramic tile cutters are used to cut tiles to a required size or shape according to the tiles setting out drawing.
6.	<p style="text-align: center;">Cement</p> 	<ul style="list-style-type: none"> • Cement will be mixed with water (mortar) to joined the tiles to the surface.
7.	<p style="text-align: center;">Water</p> 	<ul style="list-style-type: none"> • Cement will be mixed with water (mortar) to joined the tiles to the surface.
8.	<p style="text-align: center;">Tiles Spacer</p> 	<ul style="list-style-type: none"> • To achieve a consistent pattern when fixing tiles. • To make sure that all of the tiles are evenly spaced.
8.	<p style="text-align: center;">Tiles</p> 	<ul style="list-style-type: none"> • To form wall and floor coverings, and can range from simple square tiles to complex or mosaics. • To become a protective surface for areas of your home.

3.3 To Investigate The Method For Defects Liability Period

3.3.1 Introduction of Defects Liability Period

Defective construction also complies with the contract's clear descriptions or requirements, particularly any drawings or specifications, as well as any implicit terms and conditions relating to quality, craftsmanship, durability, aesthetic, performance, or design. Construction faults are flaws in a project's quality that can be recognised and corrected. As a result, construction flaws are unavoidable in the execution of construction projects, and they are typically a source of contention between the employer and the contractor or subcontractors.

To guarantee that your property is in excellent operating condition, a building flaws evaluation is recommended. So read more about building flaws inspection to make sure you're on the proper route. Defects in the Construction Inspections are conducted to determine the condition of a residential structure. Qualified building inspectors conduct these inspections and produce a report on the results. These can also assist you in determining whether or not your house is secure. Building disputes inspections can also be undertaken before to the acquisition of a property or in the case of a construction defect dispute. Common construction flaws include concrete spalling, water leaks, exterior walls, tiling issues, and structural and non-structural flaws.

Defects can occur at any time throughout the building process and in any component of the project. Defects in construction projects can be caused by a variety of factors, including inappropriate water pipe installation, low quality materials given by building merchants, or a combination of poor materials and poor workmanship. Construction errors can be caused by an architect's design error, a manufacturing problem, faulty materials, inappropriate usage or installation of materials, a contractor's failure to follow the plan, or any combination of these factors.

Before determining the scope and items of rehabilitation work, the work consultant appointed by the owners must conduct a thorough inspection of the building to determine its overall condition and rehabilitation needs, and then notify the landlords of any defects or cases that fail to meet prescribed legal requirements. The scope of the inspection includes analysing any statutory orders issued by the developer requiring rectification works to be performed on

common sections, clarifying relevant statutory requirements, and conducting a survey of residents' opinions on the building's condition.

3.3.2 Flow Of The Complete Defects Liability Period Practiced

During the defects liability period which usually lasts for six months to one year after certified completion of the works, the works contractor must rectify all defects that appear. When all rectification works are satisfactorily completed, the final certificate would be issued by the works consultant. This would trigger the release of the retention money. Subject to the settlement of final accounts, the works contract can be regarded as completed.

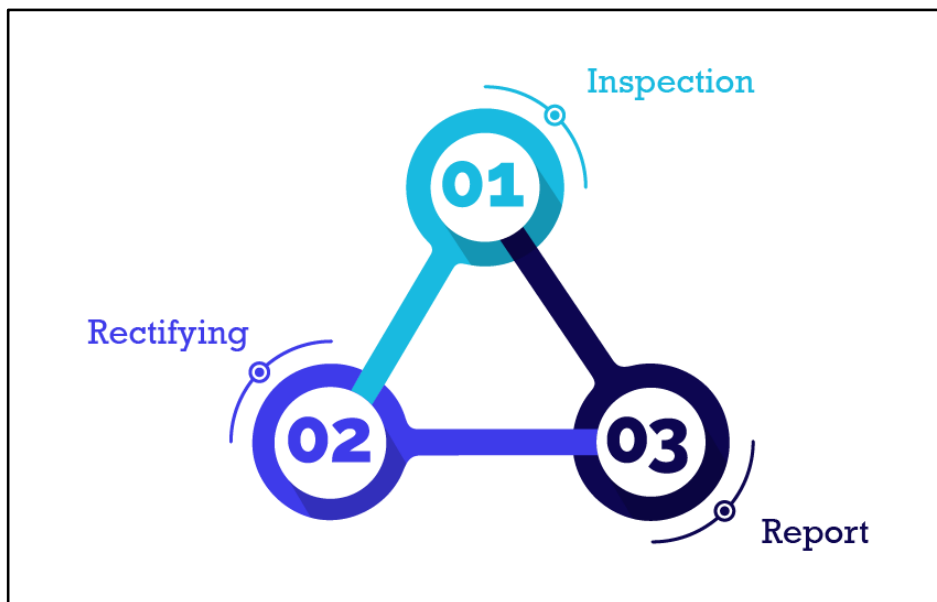


Figure 11 : Process of complete Defect Liability Period

a) Conduct Building Inspection

A thorough inspection of all architectural elements, public equipment, and facilities in the building's common spaces. If indicators of fault are found on public amenities placed in private units, the works consultant shall undertake a site inspection in the affected units, if practicable, following a competent person's evaluation, and document any places where first-hand inspection is not possible.

The commonly used method is visual inspection which is direct with the eye or non-professional equipment such as cameras. Also practiced is hammer tapping is an exterior wall inspection procedure in which a plastic hammer is used to hit on various portions of the wall surface with a plastic hammer in order to detect loose concrete or rendering by listening to the hollow sound produced by cavities. The test can be carried out on scaffolding as part of an on-site assessment, with the problematic areas being marked with spray and photographed for documentation.

During the defects liability period, the facility used a Request Work for Inspections system. Also known as RFWI, RFWI is one of the most prevalent and inevitable administrative processes in the construction industry. It is critical for contractors overseeing a project to handle RFWI effectively in order to avoid delays and cost overruns. The RFWI form is usually consist of the defects list, floor plan and tiles setting out.

The example of RFWI form that was utilised during the inspection is shown below:-

RFWI

SEHAWY BUILDERS SDN BHD REQUEST FOR WORK INSPECTION

LUAM TROPICANA - CADANGAN MEMBINA PEMBANGUNAN PERMAGAHAN YANG TERDIRI DARI-
 FASA 1 - 2 BLOK PANGSAPURI PERKHIDMATAN 35 TINGKAT BLOK A1 108 UNIT DAN BLOK B1 108 UNIT DI ATAS 4
 TINGKAT POKOK YANG MENYANDUNGI 8000 (80 UNIT), KEOLA, KEMUDAHAN RESERVIS, 1 BLOK TEMPAT 18 BOK
 KERETA 7 TINGKAT DAN KEMUDAHAN
 FASA 2 - 2 BLOK PANGSAPURI PERKHIDMATAN 35 TINGKAT BLOK A2 108 UNIT DAN BLOK B2 108 UNIT 1 DI ATAS LOT
 212 DAN LOT 213, PERSIHARAN TROPICANA, KUJ 3, MUKIM DAMANSARA, DAERAH PETALING, SELANGOR DARUL
 EHSAN.

To: Abtel ADT Abik (Asia) Sdn Bhd RFWI No: SESBK/UM/PO/TA/2021
 Abil: En. Ridhuan / En. Khaiz

The following works are/ will be ready for inspection at (time) on (date)
 Work is intended to commence at (time) on (date)

Description of Works
 Location: Tower A2 Level 3
Unit 1, 2, 3, 3A, 3 & 6
 Type of Work: PDI Inspection for Architectural Works
 Sketches (if required) _____

[Note: Where required include details of materials, labour and plant/ equipment to be used]

Submitted by (Contractor's Staff)		Received by (Consultant/Client's Representative)	
Name: <u>Muhammad Khair</u>	Date: <u>07/10/2021</u>	Name: <u>En. Khaiz</u>	Date: _____
Time: <u>8:00 AM</u>	Signature: _____	Time: _____	Signature: _____

C.C. 1. _____ 3. _____
 2. _____ 4. _____

Inspection Response
 Inspection passed. Works are allowed to proceed.
 Remedial works listed below to be completed but no further inspection required.
 Remedial works listed below to be completed and re-inspection is required.
Inspected jobs not complete at attachment
for further work.

Signature: En. Khaiz (Client Representative) Date: 9/10/2021

Revision No: 0 Issue No: 1 Effective Date: 05/10/2021

Figure 12 : The front page of Request Work For Inspection Form

Phase 3 Tender B2 - FFI Inspection

Level : 3
Unit : 1

Item	Location	Description	Remarks
1		Shower waterproofing base / FFI	
2		Wall nail signet	
3		Wall crackwall clip/ nail scratches	
4		Wall movement joint	
5		Wall corner edge need touch up	All wall corner edges need touch up
6		Window silicone movement joint touch up	
7		Window frame scratches/scruffs	
8	JR	Window handle/brass outstanding <i>Handy touch up</i>	
9		Crack on walling	
10		Door leaf need touch up	
11		Door frame expansion/need to touch up <i>Paint</i>	
12		Door slippage outstanding	
13		Door gap corner existing	
14		Crack on walling	
15		Crack on walling	
16		Crack on walling	
17		Crack on walling	
18		Crack on walling	
19		Crack on walling	
20	JR	Crack on walling	
21		Crack on walling	
22		Crack on walling	
23		Crack on walling	
24	Master Bedroom	Crack on walling	
25	Bedroom 1 & Bedroom 2	Crack on walling	
26		Crack on walling	
27		Crack on walling	
28		Crack on walling	
29		Crack on walling	
30		Crack on walling	
31		Crack on walling	
32		Crack on walling	
33		Crack on walling	
34		Crack on walling	
35		Crack on walling	
36	Openplan	Crack on walling	
37		Crack on walling	

Prepared By: *[Signature]*
Checked By: *[Signature]*

Figure 13 : The Defects List

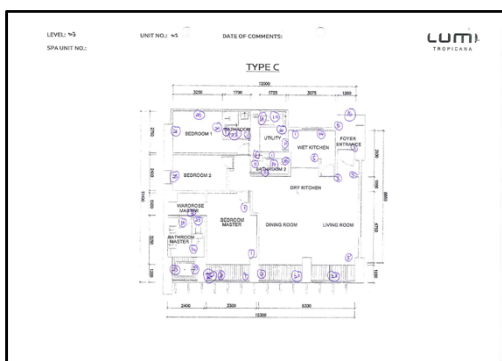


Figure 14 : The Floor Plan Of The House

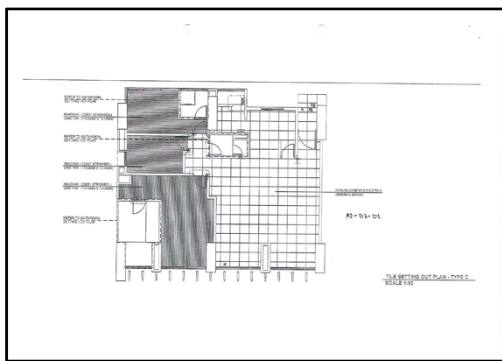


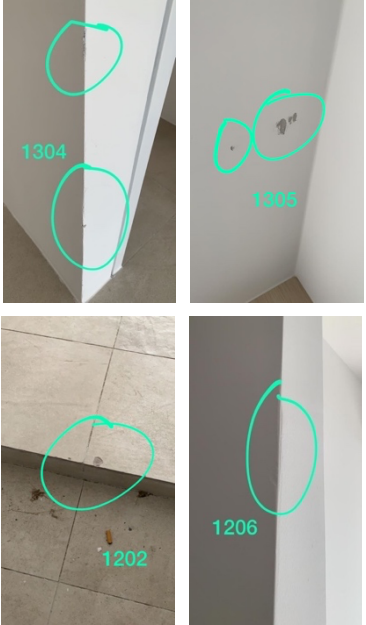
Figure 15 : The Tiles Setting Out Plan




b) Rectifying Defects Process

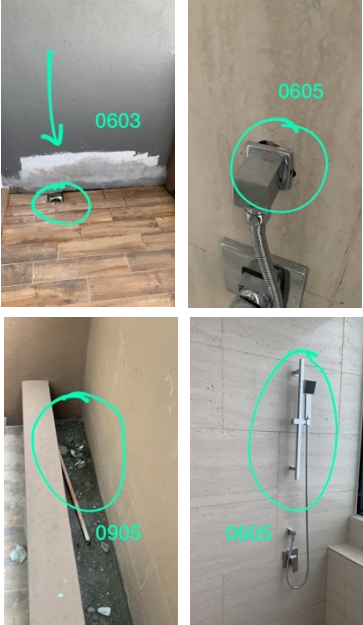
Defects in construction can occur as a result of flaws in the product itself, as well as how it is built, installed, operated, or maintained. Damages might be seen right away, such as a broken water pipe, or they can develop over time, such as a slowly shifting foundation. Understanding each of these possible failure mechanisms, which including design, installation, goods, and operation/maintenance, can assist identify potentially guilty parties when charges of building fault are raised.

The following are the categories and most common forms of architectural defects:-

Table 6 : Types And Common Types Of Architectural Defects.

Building Elements	Type Of Defects	Photos
Wall, Floor and Finishes	<ol style="list-style-type: none"> 1. Water seepage 2. Dirty floor 3. Unevenness paint 4. Untidy wall painting 5. Peeling of paint 6. Tiles / wall chipping 7. Wall damaged 8. Uneven floor level 9. Floor tile crack 	

<p>Windows and Fittings</p>	<ol style="list-style-type: none"> 1. Non-functional window 2. Dirty window 3. Window ironmongery damaged 4. Incomplete installation 5. Window corrode 6. Cracked window glass 	
<p>Doors and Fittings</p>	<ol style="list-style-type: none"> 1. Door damaged 2. Ironmongery damaged 3. Incomplete installation 4. Door key not functioning 5. Untidy door painting 6. Non-functional door 7. Detached of door stopper 8. Peeling of paint at door 9. Door frame damaged 	
<p>Ceiling Finishes</p>	<ol style="list-style-type: none"> 1. Ceiling perforated 2. Ceiling not provided 3. Leakage 4. Ceiling damaged 5. Fungus 6. Stain mark 	

<p>Sanitary Fittings, Fixtures and Toilet Cubicles</p>	<ol style="list-style-type: none"> 1. Incomplete / improper installation of fittings 2. Tap not provided 3. Leakage 4. Blockage 5. Detached of sanitary fittings 6. Non-functional floor trap 7. Water closet cover damaged 	
--	--	--

i. Method of Rectifying Hollowness Floor Tiles

Preparation

- Step 1 : Inspect the condition of the structural crack on the affected concrete slab.
- Step 2 : Locate and drill 10mm diameter holes at approximately 100-200mm intervals along the side of the crack at a 45 degree angle whenever possible for the path of the crack to be intersected at the center of the structure. The distance between holes will depend on the size of the crack to be injected.
- Step 3 : For cracks found on the soffit of a horizontal slab while the top of the slab is not accessible, injection should be performed from the underside using the same method.
- Step 4 : Clean the drilled holes with compressed air. Insert the packer into the drilled hole and ensure that the rubber sleeve of packer and cutting line of tightening nut are inserted beneath the concrete surface. Tighten the packer securely (packer might damage if over-tightened).

Step 5 : Cracks that penetrate through its soffit must be sealed from the underside with NCL EPOXY PUTTY EP810-P a day before injection.

Step 6 : Mix and apply NCL EPOXY EP810-P along the crack to seal, contain and prevent the epoxy grout from oozing out during and after pressure injection.

Step 7: Measure desired amount and mix both NCL EPOXY EP800-I's COMPONENT A & B (Mixing Ratio 2:1) thoroughly until homogeneous in a clean container.

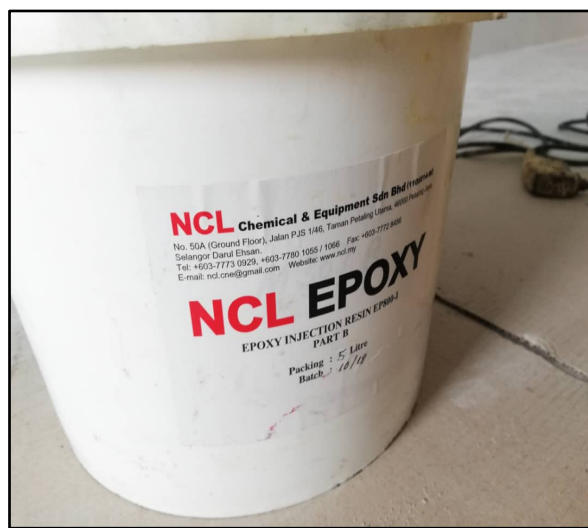


Figure 16 : Get ready NCL Epoxy EP800-1



Figure 17 : Drill holes at tiles jointing

Application

- Step 1 : Commence injection by using NCL SWM1000, SWM1100, SWDM2100, SWDM2100, NCL DHP-M1000 or M2000 high pressure injection machine.
- Step 2 : Inject NCL EPOXY EP800-1 into the crack through the injection packer(s) until the required pressure is achieved (usually 1000-1500PSI, depending on the site condition) or the evidence of material begins to emerge on the concrete surface then pause to allow material to flow and penetrate the concrete cracks. If the pressure drops gradually, this indicate that the material is flowing through and filling up the cracks and crevices in the concrete. Resume injection at the same packer when the pressure drops below 1500 PSI.



Figure 18 : Ready for injection

- Step 3 : Stop injection if the pressure remains unchanged. This shows that the concrete cracks are filled.



Figure 19 : Stop injection after the pressure remains unchanged

- Step 4 : Move to the next injection point to seal surrounding cracks and repeat the injection process to treat the entire affected area.
- Step 5 : It is recommended that pressurized grouting is performed at the previously injected packers/points for multiple times to ensure that the cracks are completely filled with NCL EPOXY EP800-I.
- Step 6 : In the event of filling vertical cracks or joints, commence injection from the bottom. In case of horizontal cracks, begin from either side.
- Step 7 : Allow the NCL EPOXY EP800-I to cure for 24 hours before removing the injected packers. Remove the exposed visible solidified epoxy putty if necessary. Plug all holes with a suitable mortar.

Cleaning

- Step 1 : Flush and clean the injection machine and hose with solvent after used.
- Step 2 : Lubricate the injection machine with lubricant such as engine oil or machine oil before storage.

ii. Method of Installing Floor Tiles

Pre-installation

Step 1 : Ensure that the floor screeding is done appropriately and levels checked before laying of floor and wall tile commences.

Step 2 : The coordination of works with other trades. Including cold water supply piping/plumbing.

Installation

Step 1 : Check the floor and must be clean, free from dust. To check and test water proofing and check for sufficient drop and fall and floor trap position.

Step 2 : Base screed to commence by incorporation the local O.P.C and coarse sand.

Step 3 : Laying floor tiles by using approved tile adhesive in bathroom / wet areas and 'Novabond' tile adhesive in Living / Dining / Kitchen areas. Used Notched trowel for dry areas and solid bed trowel for wet areas on floor tiling. Check and ensure tile joint is about 4mm.



Figure 20 : Laying floor tiles

- Step 4 : Press tiles and tap firmly into position immediately with twisting action.
- Step 5 : Grouting to 4mm floor gap using 'Novagrout' in Living / Dining / Kitchen areas.
- Step 6 : To check that adequate contact between tile base screed is maintained and make sure that there are no hollowness.
- Step 7 : Remove surplus dust and cement from tile surface and joints with a damp cloth immediately.



Figure 21 : Remove Surplus Dust And Cement

- Step 8 : Quality check should be done accordingly as per below:-
- a) Cement Mortar Mix should be 1:3.
 - b) Check 2% fall and 25mm drop is achievable.
 - c) Floor tile joint limit to 3 mm – 4 mm.
 - d) Check wall/floor tile joints are in line
 - e) Check and coordinate floor trap position.
 - f) Refer to contract specification for JKR's standard specification for building works and architectural brief.
 - g) Detail instruction on how to carry out the particular work.

h) Any specific task that requires special attention such as provision for piping

Step 10 : Point of inspection and testing, and their frequency

Step 11 : After the floor and wall tiles are completed, we randomly check for hollowness and evenness of tiles surface. At the same time protection shall be carried out to completed works.



Figure 22 : Checking for hollowness

3.4 To Determine The Problems Occurred And Solutions Taken To Solve The Problems

a) Cracked Tiles

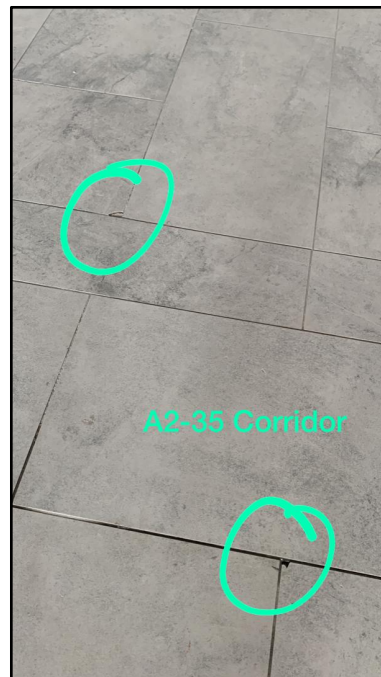


Figure 23 : Cracked Tiles

Caused

There will be voids beneath certain tiles if the glue under the tile does not cover the full surface. When pressure is applied to the tiles, it is possible that they will break. Most common causes of cracked tiles include heavy objects, such as pots and cans, being dumped on the tiles, the use of low quality tiles, an inappropriate subfloor, cutting, and bad handling.

Solutions

Tiles must be secured to the surface with a flexible adhesive that allows for minor movements between stiff tiles and the substrate without compromising the tile's stability. Tiles can be fractured if the improper substance is used to attach them, such as grout or cement mix, or if a flexible membrane is not used. Adhesive that covers the full back of the tile should be used to

secure the tiles. Any gaps or cavities between the tile and the surface might compromise their integrity, resulting in weak places and finally fractures.

b) Incorrect Measurement And Cut The Tiles



Figure 24 : Incorrect Measurement And Cut The Tiles

Caused

Usually made by workers, they carelessly measure it or their instruments is not in perfect conditions. Sometimes the measuring tape numbering is not accurate will also cause

Solutions

The length of the tiles must be corrected and readjusted according to the measurements in the picture. Before laying down each tile, double-check that it has been properly cut and labelled. So that there are no issues after the trusses are mounted on the structure.

c) **Paint Stains**



Figure 25 : Paint Stains

Caused

Paint stains on tiles are most commonly caused by careless painting works. Sometimes the paint stains on tiles are also caused when the workers are not take the precaution seriously such as putting the painting cover protection before the work.

Solutions

Usually, workers will use kerosene to get rid of the stains. But other materials such as vinegar, toothpaste, and other household items can be used to remove rust stains off tiles. If the rust marks are impossible to remove, you'll have no choice except to replace the tiles.

CHAPTER 4.0

CONCLUSION

4.1 Conclusion

During defect liability, it is the contractor's liability to make good all the defects discovered. The contractor is liable and has the right to return to the site to rectify the defect at his own cost. The contractor's liability towards the defects during defect liability is related to their right and liability during that period, the issue of whether the employer is obliged to notify the contractor of defect, whether the contractor is liable towards defective work caused by a design defect, materials supplied by the employer and whether the contractor is liable to warn the employer if any faulty design that they knew about.

When the contractor fails to correct the flaw during the defect responsibility period, he is in breach of contract, and the employer is entitled to damages. The costs of correction, loss of amenity, and subsequent loss are the damages. The judge will award fair damages to the employer for the loss caused by the contractor.

Apart from that, this study also reveal that the contractor is liable to the employer during the defects liability period and has the right to fix any problems that become apparent at his own expense. It is advantageous for the contractor to have the exclusive right to fix the faults throughout the defects liability period because the cost of remedying the defects will be less than the cost of having another contractor undertake such work for the employer. If the contractor has the only right to rectify problems, an employer who does so without first allowing the contractor to do so violates the contract. Instead of contracting another contractor to correct the problems detected during the defect liability period, most construction contracts require the employer to provide priority to the original contractor to make good the defects discovered during the defect liability period. The employer is in breach of his contractual duties if he fails to do so. Furthermore, the contractor is not liable for defective work caused by the quality of materials given by the employer, suppliers chosen by the employer, or a bad design by the designer. It is, however, the contractor's responsibility to notify the employer of the incorrect design that they were aware of.

A defective liability clause will not impair the parties' common law remedies unless the clear language is used. The contractor is in breach of contract if he refuses or fails to fix the fault under the standard form of contract, and the employer will be able to initiate a claim for damages against the contractor for flaws that surface during the defects liability period, according to the analysis of cases. However, if the employer has acted unreasonably, such as refusing to allow the original contractor to return to the site to remedy the defect or failure to notify the contractor of the defects, the employer's damages may be limited to the cost of the original contractor performing the remedial works. Under common law, the contractor is also liable for damages for loss of amenity and consequential loss.

As a conclusion to this study, both the employer and the contractor can avoid unnecessary arguments and improve their relationship by recognising their legal rights and liabilities concerning defective works that surface within the defect liability period.

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