

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

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entitled

Defect Studies During Defect Liability Period

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 Fabulous Track 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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Last but not least, my special thanks to my beloved parents for their sacrifices over the years.

Thank you so much.

ABSTRACT

Defect Liability Period (DLP) is essential in every building as the warranty of the building. It is also the period a contractor is liable to make good the defects. Therefore, the aims and purposes of this report was to identify the types of defects in a building and to investigate the problems and solutions of every defects in this building. It was conducted at Avisena Women's and Children's Specialist Hospital. This report also will focus on all the works related on how to prevent defects in a building. As a result, the building will mainly safe from any hazards in the future. In conclusion, DLP was shown to be an important role in a contract to keep a building safe.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

Every building has the defects itself whether it is performance defects, logical defects, interface defects, etc. To keep a building safe from any defects occur, a main contractor and the principal must have a contract for maintenance operation for some period of time. It is called Defects Liability Period (DLP). It is a period during which the contractor fully completes the remaining construction task, rectifies any detected defects and ensures satisfactory functioning of various services (Uher, 2002). It commonly runs for three to six months. For mechanical services there is often a separate DLP of twelve months. As its expiry, the contract between the principal and the main contractor comes to an end (Uher, 2002). According to (Robinson, 2011), it is important in this period that the contractor works in an orderly and controlled manner in order that his employees do not cause further damage while carrying out their tasks. There are two main types of certification found in construction contracts (Hughes, 2000), interim certificates and final certificates. Interim certificates where the period between interim certificates is whatever stated in the appendix. If none is stated then it is one month. Final certificates where the obligation is in general issue the final certificate within two months of the end of the defects liability period. However, the aim of this report is to discover the defects in a building during defects liability period in Avisena Women and Children's Specialist Hospital.

1.2 Background and Scope of Study

This study was carried out in Avisena Women's and Children's Specialist Hospital (Figure 1.1) in order to focus on the maintenance operation during defects liability period (DLP) within 2 years. However, the DLP contract with Avisena has activated since 6 months from 1/3/2019. In addition, this study also described on how to maintain a building from defects and describe all related methods that applied on building defects. The location plan of Avisena Women's and Children's Specialist Hospital is shown in Figure 1.2



Figure 1.1: Avisena Women's and Children's Specialist Hospital

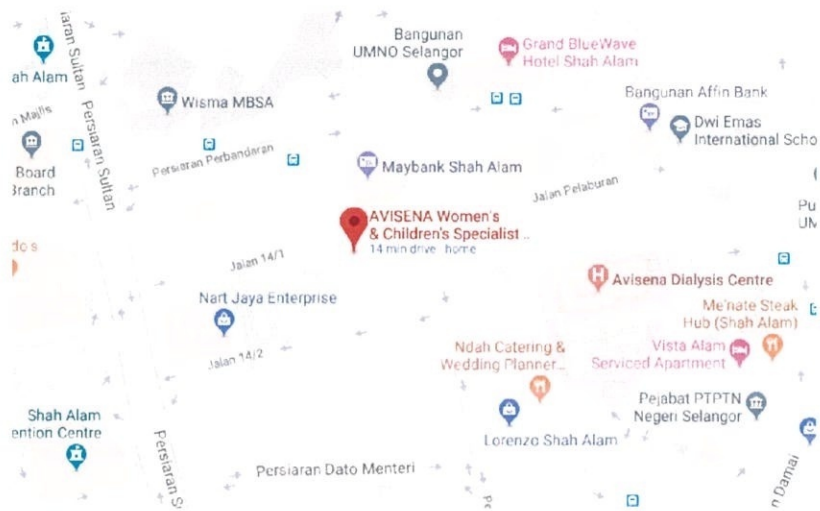


Figure 1.2: Location of Avisena Women's and Children's Specialist Hospital

1.2 Objectives

The objectives during my practical training session are:

- i. To study the type of defects in a building
- ii. To investigate the problems and solutions of defects in a building

1.3 Method of Study

The research of defects study on this building has been carried out by through several methods in gaining some information:

- 1) Observation – Observation made through inspections every week. With this method, all defects can be seen visually either by photos or videos. Information are easily taken with this method since the building has defects frequently.



Figure 1.3: Clogged Trap



Figure 1.4: Broken Pipe

Figure 3 and 4 shows the example of defects that have been taken.

- 2) Document Reviews – Any defects complaint by customers or clients will be recorded in a document which is called customer complaint form. All the complaint will be collected and turn it into a report where they do it monthly.

| FABULOUS TRACK SDN BHD | | Document No. | FT/SCF/001 |
|--|----------|----------------|------------|
| CUSTOMER COMPLAINT FORM | | Effective Date | 13/02/15 |
| | | Issue No. | 2 |
| | | Revision No. | 0 |
| Plant (Name / Company) | | Complaint No. | 05/10/15 |
| Contact No. | | Recorded By: | |
| Date / Time | 9/8/2015 | Name | |
| | | Date / Time | 11:20 AM |
| Contents of Enquiry / Complaint / Suggestion (Attach relevant documents if available) | | | |
| L9 - Bikk oncall // becok dmi calling | | | |
| Response / Decision / Action Taken (Attach relevant documents if available) | | | |
| Replied By: | | Verified By: | |
| Name: | | Name: | |
| Date: | | Date: | |

Fabulous Track
Sdn Bhd. 00179101
03 MAY 2015
RECEIVED
MAINTENANCE DEPT.

Figure 1.5: Customer's Complaint Form

Source: Fabulous Track Sdn Bhd

- 3) Interviews – During inspections and observation, unstructured-interviews was carried out by asking a question to my supervisor and engineer about defects that occur in this building.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Fabulous Track Sdn Bhd (FTSB) was incorporated in September 1999. The company started its business in assisting with building hand-over and integrity checking, as well as general maintenance for residential or commercial buildings.

In 2013, with the spirit of moving forward, Fabulous Track Sdn Bhd (FTSB) has expanded its service offering to become an integrated facilities management company, from building hand-over to facilities engineering maintenance, landscape, ground maintenance and cleaning services.

Fabulous Track Sdn Bhd (FTSB) consistently ensure high standard of technical solutions, competitive costs and latest technologies.

FTSB also expert in general cleaning services for commercial cleaning. General cleaning consists of basic cleaning of all visible items in the premises. This type of cleaning is to remove unwanted dirt or dust from surfaces.

- i. Sweeping/ Vacuuming/ Mopping
- ii. Toilet/ Washroom cleaning
- iii. Hygiene Cleaning & Sanitizing
- iv. Floor Polishing (buffing)
- v. Scrubbing
- vi. General Dusting
- vii. Wiping Windows (Internal/External)
- viii. Remove Cobwebs

Besides from commercial cleaning, they also expert in industrial cleaning such as

- i. Removing post construction or renovation materials garbage
- ii. Wall tiles cleaning and removing dust
- iii. Spot cleaning
- iv. Pressure jet cleaning
- v. Floor polishing
- vi. Scrubbing

For maintenance services, FTSB also provides Mechanical & Electrical (M&E) and Civil & Structure Maintenance.

Mechanical & Electrical Maintenance

- i. Air conditioning
- ii. Water tank
- iii. Lift
- iv. Plumbing
- v. Lighting system
- vi. Fire fighting

Civil and Structure Maintenance

- i. Building maintenance
- ii. Swimming pool
- iii. Communication
- iv. Piping system

2.2 Company Profile



FABULOUS TRACK SDN BHD

Vision of Company

Providing excellent facilities management system professionally.

Mission of Company

- Focus on technology and innovation
- Through timely completion and delivery
- Strengthen our branding and image
- Beyond customer's satisfaction

Core Values

The cultural of excellence professionalism & integrity environment.

Authorized Capital

RM5,000,000.00

Paid Up Capital

RM1,000,000.00

2.3 Organization Chart

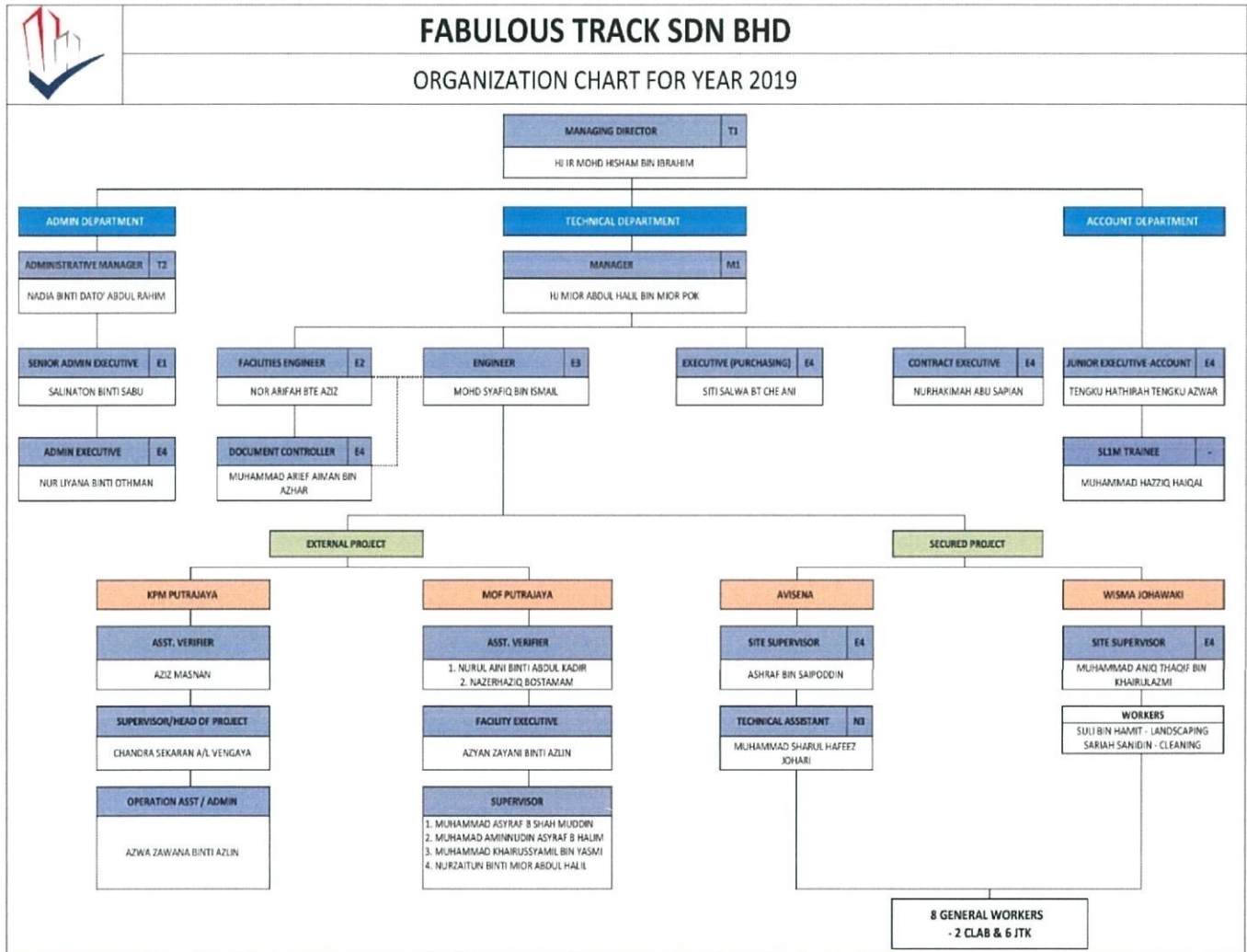


Figure 2.1: Organization Chart FTSB

Source: Fabulous Track Sdn Bhd

2.4 List of Projects

2.4.1 Completed Projects

| No. | Project Title | Contract Value | Contract Duration | Date of Site Ownership | Date of Completion | Authority's Address |
|-----|--|----------------|-------------------|------------------------|--------------------|--|
| 1 | Kerja-kerja Menyelenggara Landskap di Institut Jantung Negara | PNC | 24 Months | 1/7/2016 | 30/6/2018 | Institut Jantung Negara, 145, Jalan Tun Razak, 50400 Kuala Lumpur |
| 2 | Tawaran Menjalankan Kerja-kerja Pembersihan dan Pencucian Bangunan | PNC | 9 Months | 16/5/2016 | 15/2/2017 | Kolej Kediaman Tun Syed Zahiruddin (Kolej Sembilan), Universiti Malaya, Jalan 16/4, 50603 Kuala Lumpur |
| 3 | Kontrak Sebutharga Perkhidmatan Memotong Rumput dan Mencuci Longkang di Markas Staf Stesen Sungai Besi (Sektor A), Kem Perdana, Sungai Besi, Kuala Lumpur | PNC | 9 Months | 1/9/2016 | 31/5/2017 | Markas Logistik Tentera Darat, Kem Imphal, Kumpulan Pengurusan, Jalan Padang Tembak, 50634, Kuala Lumpur |
| 4 | Facility Management and Maintenance Works During Defect Liability Period For Cadangan Pembangunan Kompleks Stadium Mini Bandar Tun Abdul Razak Di Bandar Pusat Jengka, Pahang Darul Makmur | PNC | 24 Months | 24/12/2015 | 26/12/2017 | Johawaki Sdn Bhd Lot 3669, Jalan Batu Tiga Sungai Buloh, 40150 Shah Alam Selangor |

| | | | | | | |
|---|--|-----|--------------|----------|------------|--|
| 5 | Cadangan Naik Taraf Hospital Kuala Lumpur | PNC | 29 Months | 2/7/2014 | 31/12/2016 | Johawaki Sdn Bhd Lot 3669, Jln Batu 3- Sungai Buloh, 40150 Shah Alam Selangor |
|---|--|-----|--------------|----------|------------|--|

2.4.2 Project in Progress

| No | Project Title | Contract Value | Contract Duration | Date of Site Ownership | Date of Completion | Authority's Address |
|----|--|----------------|-------------------|------------------------|--------------------|--|
| 1 | Kontrak Pengurusan Fasiliti Bagi Kompleks Kementerian Pendidikan Malaysia (KPM) Dari Agensi Di Bawah Jabatan Perdana Menteri | PNC | 36 Months | 21/8/2017 | 20/8/2020 | Jabatan Kerja Raya Putrajaya, Aras 3, Blok C7, Kompleks C, 62582 Putrajaya |
| 2 | Cadangan Mereka Bentuk, Membina Dan Menyiapkan Hospital Pakar Kanak-kanak 140 Katil Di Precint 2.7, Seksyen 14, Shah Alam, Daerah Petaling, Selangor Darul Ehsan | PNC | 24 Months | 1/3/2019 | 28/12/2021 | Johawaki Sdn Bhd Lot 3669, Jln Batu 3-Sg Buloh, 40150 Shah Alam, Selangor |
| 3 | Pengurusan Fasiliti Dan Penyelenggaraan Di | PNC | 60 Months | 16/6/2019 | 15/6/2024 | Jabatan Kerja Raya Putrajaya, Aras 3, Blok |

| | | | | | | |
|---|---|-----|-----------|----------|------------|---|
| | Kementerian Kewangan Malaysia (Lot 2G2), Presint 2, Putrajaya Bagi Tahun 2019 Sehingga 2024 (Housekeeping and Pest Control) | | | | | C7, Kompleks C, Pusat Pentadbiran Kerajaan Persekutuan, 62582 Putrajaya |
| 4 | Building Maintenance Proposal For Wisma Johawaki Lot 3669 Jalan Batu 3-Sg Buloh, Seksyen U6, 40/50 Shah Alam, Selangor | PNC | 12 Months | 1/1/2019 | 31/12/2019 | Johawaki Sdn Bhd Lot 3669, Jln Batu 3-Sg Buloh, 40150 Shah Alam, Selangor |

CHAPTER 3.0

DEFECT STUDIES DURING DEFECT LIABILITY PERIOD

3.1 Introduction to the Case Study

The project that I have been assigned to during the practical training was *Facility Management and Maintenance During Defect Liability Period For Cadangan Mereka Bentuk, Membina Dan Menyiapkan Hospital Pakar Wanita Dan Kanak-Kanak 140 Katil Di Precint 2.7, Seksyen 14, Shah Alam, Daerah Petaling, Selangor Darul Ehsan*. The cost for this project is strictly private and confidential due to several reasons. This contract has been signed for about 24 months starting from 1st March 2019 and estimated finished on 28th December 2021.

The project that I have been assigned for was focused on maintenance work and facility management in this building. So that, in the duration range of the practical training, Site supervisor, Encik Ashraf have to keep up to date for any defects that occur in this building.

There are few person in charge for this project to ensure it works according to plan, such as the managing director, IR Mohd Hisham bin Ibrahim, site engineer, Encik Syafiq bin Ismail, and site supervisor, Encik Ashraf bin Saipoddin.

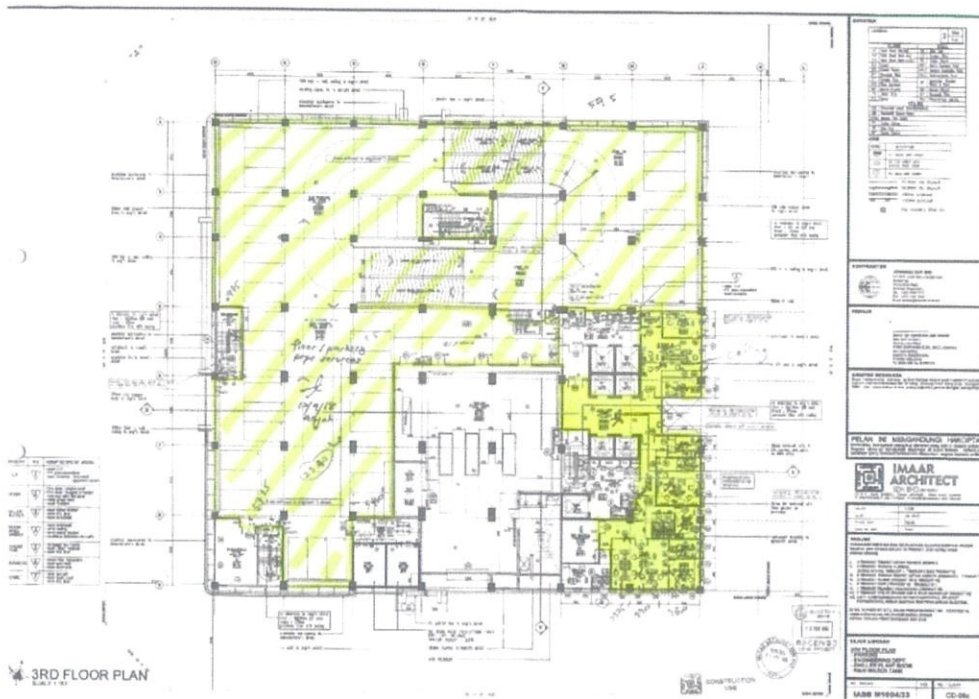


Figure 3.1: Plan Drawing for Avisena Women's and Children's Specialist Hospital



Figure 3.2: Side Elevation of Avisena Women's and Children's Specialist Hospital

3.2 Type of defects in this building

This research aims to study the type of defects for *Cadangan Membina Dan Menyiapkan Hospital Pakar Wanita Dan Kanak-Kanak 140 Katil Di Precint 2.7, Seksyen 14, Shah Alam, Selangor Darul Ehsan* during defect liability period. There are two types of defects that have been identified which are architectural defects, where it requires building works such as wall and ceiling cracks, including doors, windows, and finishes such as tiling, plastering and painting. The other type is mechanical and electrical (M&E) defects which consists of pipeworks, ductworks, fittings, fire protection, etc.

3.2.1 Architectural Defects

This is one of the common defects occurred in every existing buildings. It is probably cause from design or material deficiencies. Design profesional such as architects and engineers, who design buildings and systems do not always work as specified, which can result in a defect. Typical design deficiencies relate to building outside of the specified code. Roofs are an example of a typical design defect that result in water penetration, intrusion, poor drainage, or inadequate structural support.

The use of inferior design materials can cause significant problems, such as windows that leak or fail to perform and function adequately, even when properly installed. Window leaks can result from many things including improperly flashed windows, and improperly installed frames. Common manufacturer problems with building materials can include deteriorating flashing, waterproofing membranes, interior dry wall, and other wall products used in wet or damp areas such as toilet and laundry rooms. Figure 3.3 shows the example of watermark on ceiling. The wall crack is shown in Figure 3.4 and Figure 3.5 shows the example of water leaking from slabs.

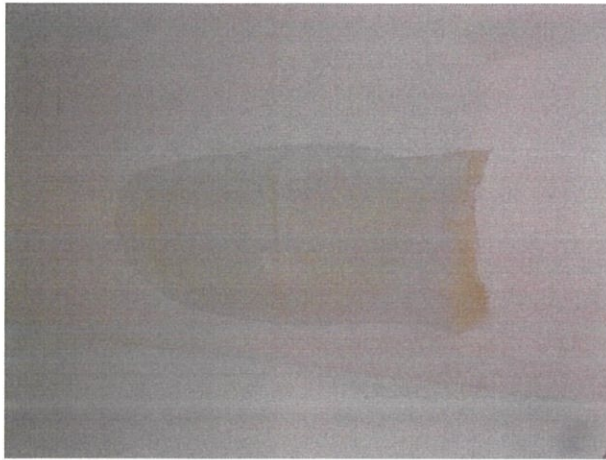


Figure 3.3: Watermark on ceiling

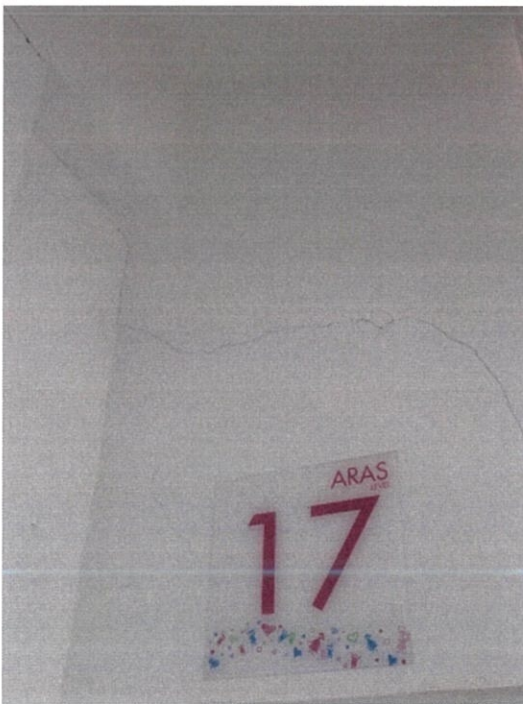


Figure 3.4: Wall crack



Figure 3.5: Water leaking from ceiling

3.2.2 Mechanical and Electrical (M&E) Defects

Mechanical and electrical (M&E) faults are errors in assets integrity and function that interrupt equipment operation that can cause accident in building facilities, and create a huge hazard for personnel.

Faults include any unanticipated discontinuities in the normal operation of assets and equipment. Factors from normal plant activities, combined with the stress of other defects and influences from the surrounding environment, can combine and cause unexpected faulty.

Power transformers and other electrical equipment contain sensitive componentry that is subject to cause complete asset failure if a fault occurs. Faults in power transformers can create a huge risk for the entire facilities, along with causing costly shutdowns that slow plant production and limit production capacity. Insulation degradation, overheating, surges, moisture mechanical defects and other factors that contribute to many common type of electrical faults. Figure 3.6, Figure 3.7 and Figure 3.8 are the example of M&E defects in Avisena Women's and Children's Specialist Hospital.



Figure 3.6: Broken Pipe



Figure 3.7: Water leaking from pipe



Figure 3.8: Thermostat wire trip

3.3 Problems and solutions for defects in this building

This research aims to find a solution for every problem related to building defects whether it cause from structural or mechanical and electrical (M&E) defects. These are the few problems during the practical training:

3.3.1 Cracks in plaster ceiling



Figure 3.9: Plaster ceiling cracks

This problem is quite common in this building especially in a damp area such as toilet. Typically, plaster ceiling cracks have two causes either it is building settling and temperature or moisture fluctuations in an attic, which result in the expansion or contraction of framing members. Figure 3.9 shows the example of plaster ceiling cracks.

Methods and solutions:

1. For the preparations, equipment and items that will needed are skim coat, emulsion paint, squeegee knife and paint roller. Figure 3.10 shows the emulsion paint. Skim coat is shown in Figure 3.11. Figure 3.12 shows the example of ladder and the canvas is shown in Figure 3.13



Figure 3.10: Emulsion paint



Figure 3.11: Skim coat



Figure 3.12: Ladder



Figure 3.13: Canvas

2. Firstly, prepare the surface to skim and cover the floor with canvas or plastic cloth to avoid skim coat spilled on the floor. Determine the damage to ceilings. If there is a large damage for example a big holes, repair the damage first. Figure 3.15 shows the area that was covered with canvas.



Figure 3.14: Area covered with canvas

3. Clean through the ceiling. Dust first, then wash if necessary to remove any grease. Use a damp towel to wipe down the surface.
4. The essential part was preparing materials. Pre-mixed skim coat comes ready to apply to the surface. Water added to the pre-mixture skim coat for some quantity according to the size and area of cracks. Gather the tools and equipment before start skimming. Ladder or scaffolding are important for a high ceiling.

5. First skim coat applied. Thickness of coat to install has decided. Skimmer plate was held in left hand and squeegee knife in right hand. It may have to adjust the technique to get desired thickness and texture. It can always add more compound to the surface, but once it dry, it is messy and time-consuming to remove. The ceiling was painted right after the skim coat dried with white emulsion paint. Figure 3.15 shows the worker repaint the ceiling. Figure 3.16 shows the worker install the first skim coat layer.

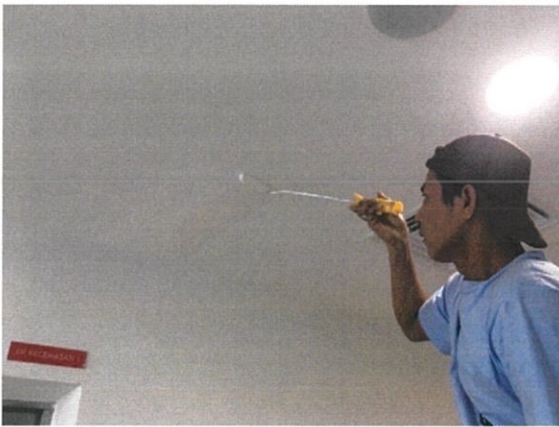


Figure 3.15: Worker repaint ceiling after skim coat dry



Figure 3.16: Worker install first skim coat layer

3.3.2 Leaking pipes

There are several different ways a pipe can start leaking:

1. **High water pressure** - High water pressure leads to damaging wear and tear on pipes. Water zipping through the pipes at high speeds increases the risk of pipes bursting. The sudden changes to the direction of water flow can be too much for pipes to bear, eventually resulting a leaking.
2. **Temperature changes** - Extreme changes in temperature (generally from cold weather) can cause pipes to crack and begin leaking.

There are few signs to notice the pipe was leaking:

1. Watermark on ceiling and walls
2. Fungus and stains all over the ceiling
3. Smells foul in toilet
4. Water flow decreases
5. Discolored water

Figure 3.17 shows the example of fungus on the ceiling. Figure 3.18 shows the example of watermarks on the ceiling. Figure 3.19 shows the example of leaking pipes.



Figure 3.17: Fungus on ceiling plaster



Figure 3.18: Watermark



Figure 3.19: Leaking Pipes

Methods and solution:

1. Firstly, the water supply was shut off. Main water supply often located at near of the fittings. The valve was turned clockwise to shut off the water so the leak stops and does not cause more damages. Figure 3.20 shows the main water supply was located.



Figure 3.20: Main water supply

2. Then, the faucets that connected to the pipe was turned on to drain the water out until the pipe was completely empty.
3. The leaking area on the pipe was wiped using cleaning cloth to avoid slippery while trying to work on it.
4. The equipment and tools was prepared before the work started. Equipment such as bondite epoxy putty, white tape and rubber pipe connector. Figure 3.21 shows the bondite epoxy putty. White tape is shown in Figure 3.22



Figure 3.21: Bondite epoxy putty



Figure 3.22: White tape

5. Bondite epoxy putty was mixed by hand to combine it. Small ball of epoxy putty was ripped off from the tube and knead it together between fingers. The darker epoxy will mix with lighter exterior to activate it. Once the epoxy has a consistent light grey color that means it was completely mixed and ready to use.
6. The epoxy putty was wrapped around the leaking area. The putty was molded around the leak on the pipe so it wraps completely around it. The putty forms a layer that is about 1.3 cm thick around the leak so it holds in place. Figure 3.23 shows the worker wrapped epoxy putty around the leaked area.



Figure 3.23: Worker wrapped putty around the leak area

7. After finishing covered the leaking area, the putty was set for 5-10 minutes before turning the water on to let it becomes hard and solid. Once the putty solidify itself, the water can turn back on. But this is the temporary fix only. Change the pipe if the damage becomes worst. Figure 3.24 shows the condition of pipe after wrap the epoxy putty.

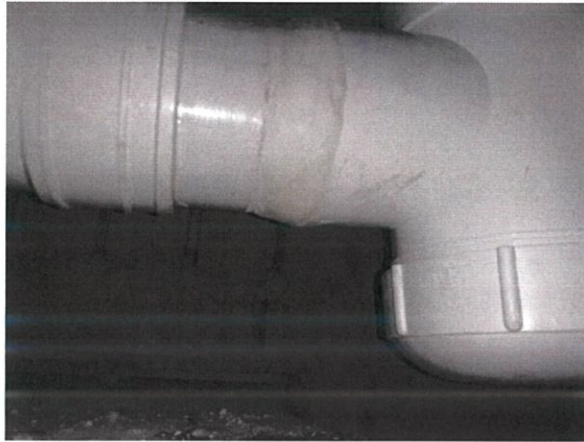


Figure 3.24: Condition of pipe after wrap the epoxy putty

3.3.3 Water dripping from slabs and walls

Water leaking from slabs is often clear water, rather than brown and dirty if a faulty plumbing pipe is the culprit. Leaking will usually be quite steady if the ceiling leak as plumbing-related. Especially if a water supply pipe is to blame, the water dripping from the slabs may be never-ending. Figure 3.25 shows the water leaked from soffit slab.



Figure 3.25: Water leaking on slabs

In addition, slabs and walls leaking can cause by many things such as thermal expansion and high water pressure in plumbing system, rainwater and failed insulations in the walls and slabs. Figure 3.26 shows the water leaked from wall.



Figure 3.26: Water leaks on wall

Methods and solutions:

Technically, there is two different ways to fix the slabs and walls leaking that applied in this building during defect liability period.

1. Polyurethane Injection
2. Polyurethane Foam Spray

Polyurethane Injection

It is the one of suitable waterproofing method for some water leaking issues. This method applied chemical pressure into the defect area or specifically in the cracks. When the polyurethane touches the base with water, the chemical reacts and expands to seal the cracks. It is one of preferred method and easiest way than hacking. Just drill some holes on the slabs, and apply the PU injection in the holes. These are the steps during PU injection:

1. Equipment was prepared before work started. Equipment and tools such as:
 - Injection machine that includes liquid bottle, piston, nozzle set, filter, etc.
 - Packers
 - Ladder
 - Canvas
 - Cleaning cloth
 - Driller



Figure 3.27: Injection Machine



Figure 3.28: Packer



Figure 3.29: Canvas



Figure 3.30: Ladder



Figure 3.31: Driller

2. Firstly, the stains and watermarks was cleaned by cleaning cloth. The position to put the packer was marked. Figure 3.32 shows the watermarks on slab.



Figure 3.32: Watermarks on slabs

3. The area was covered by canvas to avoid polyurethane chemical touches the floor and dusts surround the area. PU chemical will immediately hardened when it touches floor and difficult to remove it. Figure 3.33 shows the area covered with canvas.



Figure 3.33: Area covered with canvas

4. The marking area was drilled using driller and the packer was pushed into every holes. Every one packer was placed about 30 cm alongside the cracks. Figure 3.34 shows the area marked using driller

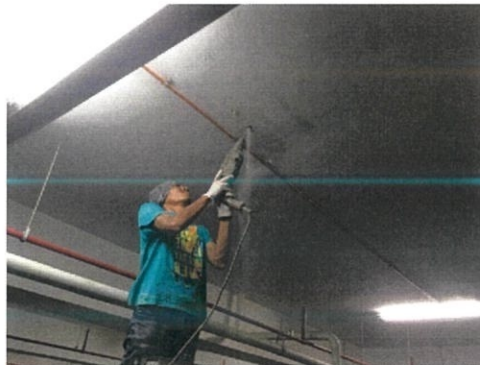


Figure 3.34: Area marked with driller

5. The packer was connected with the nozzle to fill the polyurethane chemical. PU chemical will expand through the cracks and starts solidified. Figure 3.35 shows the packer was connected with the nozzle

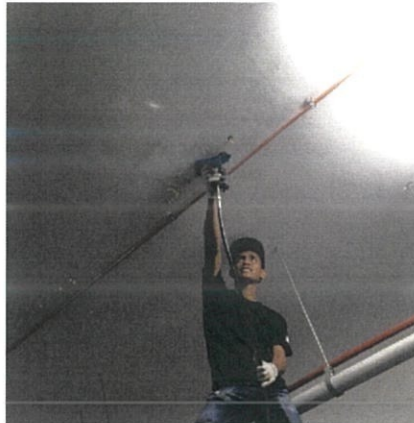


Figure 3.35: Nozzle connected with the packer

6. After 1-2 days of injection, the extravasation was removed. Figure 3.36 shows the extravasation was removed. Figure 3.38 shows the condition of slabs after injection.

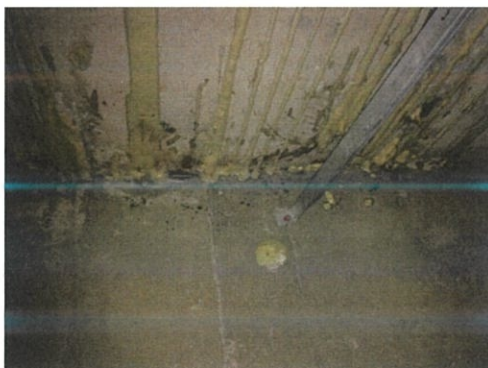


Figure 3.36: Extravasation removal

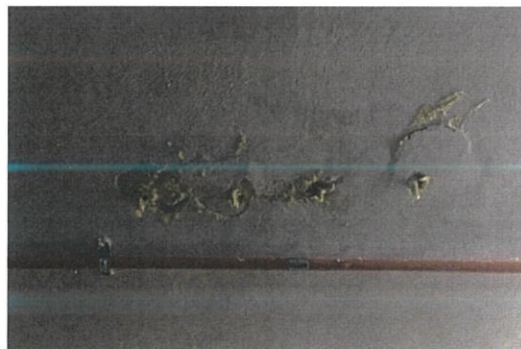


Figure 3.37: Condition of slab after injection

Spray Polyurethane Foam (SPF)

Spray polyurethane foam (SPF) is an insulation that also functions as an air barrier and depends on type, as a bulk water barrier and moisture vapor retarder. SPF is made by reacting MDI with a polyol blend. These two liquids components are joined under pressure in a spray nozzle where they applied directly onto walls or slabs. Once the reacting liquid hits a surface, it expands 30 to 120 times and solidifies into a foam matrix. SPF is typically applied by certified professionals.

SPF seals and protects the area from infiltration of hot air, cold air, moisture and sound. Its R-value reduces conductive heat transfer and its air barrier properties help reduce convective heat transfer. SPF is an ideal insulation product for residential, commercial, and industrial building.

These are the benefits using SPF in a building.

- Offers higher thermal resistance
- Reduce air infiltration
- Reduces energy losses
- Improve indoor air quality
- Reduce utility cost

These are the steps during Spray Polyurethane Foam (SPF):

1. Equipment was prepared before work starts.

These are the mandatory equipment for PPE guidance to avoid hazards.
























| | One-component Cans | Low Pressure Two-Component Kits | Refillable Systems | High Pressure High Pressure Spray Systems |
|--------------------|---|---|---|---|
| Routes of Exposure | PPE | PPE | PPE | PPE |
| Eyes | Safety Glasses  Safety Glasses | Safety Glasses  or  Safety Glasses or Goggles | Safety Glasses  or  Safety Glasses or Goggles | FF Mask/Hood  or  FF Mask/Hood |
| Skin | Long Sleeves  | Long Sleeves  | Long Sleeves  | Full Body Suits  Full Suit |
| Hands | Gloves  | Gloves  | Gloves  | Gloves  |
| Lungs | Avoid Breathing Vapors  Provide Good Ventilation | Respirator  &/or  Air Purifying OV / Pre-filter Provide Good Ventilation | Respirator  &/or  Air Purifying OV / Pre-filter Provide Good Ventilation | Air Supply  or  or  FF Mask/Hood or FF Air Purifying Airline OV/Pre-filter Provide Good Ventilation |

Figure 3.38: Mandatory Equipment For SPF

Source: Berkat Usaha Sdn Bhd



Figure 3.39: Drums that contains MDI and polyol blend

Figure 3.39 shows the two chemicals of SPF which are MDI and polyol blend. MDI or the A-side formulations has a potential risk of irritation and sensitization through inhalation and skin contact. Exposure can affect skin, eyes, and lungs. Once sensitized, continuing exposure can cause persistent or progressive symptoms and even life-threatening asthmatic reaction.

The B-side formulations for SPF use five basic chemical classes which are polyols, blowing agents, catalysts, flame retardants and surfactants. The polyol blend has a potential health risk of irritation to the respiratory system, skin and eyes.

2. Next, the jobsite was prepared to make it easy as possible for the foam crew to access the work area and install the foam correctly and effectively. The area was covered with canvas to avoid the spray spread outside the spray zone. Figure 3.40 shows the jobsite was covered with canvas.



Figure 3.40: Jobsite was covered with canvas

3. The drainage plane membrane was installed starting at the top of the wall. Figure 3.41 shows the installation of drainage plane membrane.



Figure 3.41: Drainage plane membrane

4. Before SPF started, all the manufacturer installation was followed by all crew. Verify that all processing parameters are within the manufacturer's tolerances. Isolate and ventilate the work zones.
5. The SPF was started in vertical lines behind the studs to seal around the brick ties and where the drainage plane membranes meet. The thickness of foam was 2 inches as recommended by the manufacturer. Figure 3.42 shows the progress of SPF. Figure 3.43 shows the thickness was measured according to manufacturer.



Figure 3.42: SPF in progress



Figure 3.43: Measuring thickness

6. The excess foam that exceed 2 inches was removed by flattened it using saw right after SPF finished. Figure 3.44 shows the foam was flatenned.



Figure 3.44: Flattened the foam

7. Lastly, the foam was tested by performing water on the wall assembly to identify any leakage before installing drywall.