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UNIVERSITI TEKNOLOGI MARA
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UNIVERSITI TEKNOLOGI MARA

**DEPARTMENT OF BUILDING
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**PRACTICAL TRAINING REPORT
BGN310**

METHOD OF RENOVATING SCHOOL TOILET

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(AP116-5G)

**DEPARTMENT OF BUILDING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITI TEKNOLOGI MARA
(PERAK)**

AUGUST 2021

It is recommended that the report of this practical training provided

By

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entitled

METHOD OF RENOVATING SCHOOL TOILET

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

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**DEPARTMENT OF BUILDING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITI TEKNOLOGI MARA
(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 A. H. Ayub Enterprise for duration of 20 weeks starting from 23 August 2021 and ended on 7 January 2022. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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Date : 23rd August 2021

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Finally, my special thanks to my beloved parents for their sacrifices over the years. Thank you so much.

ABSTRACT

The toilet is the most private room or area of a building, with various fundamental components and fixtures such as a toilet bowl, sink, and hose, allowing people to relieve their urge to pee, excrete, or menstruate in solitude. As a result, this report will go over the details of the toilet renovation procedure as well as the problem and its solution. This report was completed as part of the internship criteria at UITM Perak. The goal of the report is to gather knowledge and information about toilet renovation methods, as well as to identify the problem with the toilet and how to solve it. It will concentrate on the toilet renovation procedure to determine the methods used and the problems encountered. To demonstrate the process of toilet refurbishment from start to completion, which must adhere to the sequence of work specified in the method statement, this report will also evaluate any problems that may have arisen during the refurbishment and provide an efficient solution to solve the problem without causing any problems that would prevent future work.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

In the building construction, a restroom, often known as a toilet, is a room or cubicle that contains sanitaryware or other receptacles for the disposal of human waste. The name “restroom” arose from the fact that, in the early 1900s, upscale restaurants, theatres, and performing arts centers would frequently have comfy chairs or sofas positioned within or near the real toilet and sink facilities. Depending on the country, toilets are known by a variety of different names. For instance, restrooms, men’s rooms, and washrooms in the United States; and toilets, lavatories, water closets, or W.C., for ladies and gents in Europe. There is a distinction between a toilet and a bathroom. For example, a toilet is a location that typically includes a toilet bowl, urinals, and a wash basin. A complete bathroom includes a sink, a shower, a bathtub, and a toilet bowl. Personal toilets and public toilets are the two sorts of restrooms or toilets. Personal toilets are typically seen in homes or small restaurants. It is a room with one toilet bowl, a urinal, and a sink. Furthermore, a public toilet is a room or small building featuring toilet cubicles, urinals, and sinks for public use, which is frequently located in public places such as a train station or a shopping mall. Both toilets and sanitary equipment are normally connected to a public drainage system.

In a single day, hundreds of individuals may use public restrooms. It is vital to maintain a safe and sanitary public restroom for the general population. A filthy, poorly maintained restroom will soon alienate patrons from the surroundings. The cleanliness of the restroom is critical to boosting public satisfaction as well as the health of the citizens. Maintaining good hygiene also aids in the preservation of a public restroom’s condition. Dirt, mildew, and mold can degrade or stain your flooring, toilets, and sinks. It is possible to keep the public restroom in excellent shape by keeping the surroundings clean and sanitary. A more efficient toilet will save you money in the long term while also reducing environmental stress. Remodeling the toilet allows you to replace outdated, inefficient elements with new, efficient features, giving the toilet a new, fresh, and clean appeal. Renovations will increase room, minimize energy usage, and preserve our cultural traditions while bringing the toilets up to the most recent

technical standards. There are numerous reasons for refurbishment, the most significant of which is to improve living comfort and the indoor environment.

Every restroom consists of having the same component. For example, every toilet has a toilet, urinal, and sink. However, there are many types of toilets. To narrow down the types, there are three types of the most used toilet in Malaysia. The first is a one-piece toilet, in which the bowl and tank are one unit with no gaps. A separate hinge may or may not still hold the seat in place. The main benefit of a one-piece toilet is that it is significantly easier to install. Simply position it in the proper location and connect the tank and bowl. A two-piece toilet, as opposed to a one-piece toilet, is made up of a bowl and a tank that are built independently and connected by pipes. The bowl is on the ground. The tank must be secured in some way, whether to the bowl, the wall, or both. Two-piece toilets are easier to build and thus less expensive than one-piece toilets. The last one is the squat toilet. Although this toilet is old-fashioned and outdated, it is still relevant for use in buildings like schools. Squat toilets are used across the world, but they are especially widespread in Muslim nations like Malaysia. In Malaysia, anal cleansing with water is likewise the cultural norm, and it is easier to perform than using toilets in a sitting position. It consists primarily of a toilet pan or bowl at floor level. This type of toilet pan is sometimes known as a “squatting pan.” A squat toilet can have a water seal and therefore be a flush toilet, or it can be without a water seal and thus be a dry toilet. The term “squat” refers simply to the typical defecation position.

Toilets can provide far more than just access to urinating and feces. People also wash their hands, groom themselves in the mirrors, take care of their menstrual hygiene, and use the rubbish bins. Citizens can use the facilities, which are usually divided into male and female toilets. The entire room, or a stall or cubicle, including the toilet, is usually locked. Toilets have an impact on both community health and individual well-being. People can enjoy outings and physical activities in their communities where restrooms are available. Because exposure to human waste causes diseases, toilet use is critical to global survival and development. Toilets and proper washing stations can help to prevent the spread of various diseases and parasites, such as diarrhea. Furthermore, citizens’ mental well-being improves when they know the place “to go” is accessible, gratifying, and convenient to use.

There are many different types of toilets, but the aim of this is to discover the ideal school toilet renovation method in Malaysia.

1.2 Objective

The objective of this report are:

- To investigate the method of renovating school toilets process.
- To determine the time of renovating school toilets process.
- To identify the problem occurred and the solution taken to solve the problems of renovating the school toilets.

1.3 Scope of Study

The scope of study has been carried out at SMK Puteri Ampang, Jalan Ampang, Kampung Datok Keramat, 55000 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur. The project had started on 13th September 2021 and completed on 24th October 2021. The renovation is about replacing the school toilet's old tiles, Doors and 4 squat toilets to new tiles and 4 two-piece toilets to give the school toilet a modern and fresh look. The whole project cost is Forty-Nine Thousand Nine Hundred- and Ninety-Seven-Ringgit Malaysia (RM 49,997.00). The project is already finished. Therefore, the focus of the study is to determine on how the toilet renovation process is undertaken. Hence, the study will be explained not only about the method of toilet renovation, but it also includes the advantages of toilet renovation. Furthermore, the problems and solutions are also included in this study. Even so, the study does not concentrate on the quality of manpower or labors, the cost, and the duration matters. To fulfil the data, there were three method that needed to be carried out which are observation, Interview, and document reviews. In conclusion, all further explanations relating to the above method were explained as below.

1.4 Method of Study

1. Observation

The observation is a way of collecting data through observing. The observation is about how the school toilet renovation starting from site preparation until the finishing. The usual time taken for the observation roughly around 2 hours. It depends on the procedures. When the procedures require the more time to wait for the next procedures for examples, the times needed to dry the waterproofing to proceed to the next methods, the longer it takes to complete the toilet renovation process. For the finishing of the toilet, it took 1 days only to beautify and inspect the toilet to ensure the quality of the work. Overall, it took 5 weeks for the toilet to be fully renovated. Meanwhile. The observation of the school toilet renovation had been recorded by smartphone and some notes that lasted for 20 weeks.

2. Interview

The interview is one approach for gathering renovation data by conducting a structured or semi-structured interview with a trusted individual for the project. The interview was conducted while the observation and when work at the site were being carried out. The interview was performed with the company director, the site supervisor, and the contractor, who oversees the project while it is being developed. Semi-structured interviews were also performed each week in the office with the contractor in charge of carrying out the project, lasting around 30 minutes. The semi-structured interview was documented using short notes.

3. Document Review

The documents reviewed that were used to collect all the data for the renovation include the company profile, construction cost, standard operating procedures (SOP), progress report, and photographs taken by other workers. The project estimate will be used as a reference at the site where the school toilet renovation is being monitored. The images that belong to others are also the greatest references for document reviews. The average time for document reviews is 10 minutes. This document is being reviewed at the office and the site.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company


A.H. Ayub Enterprise is a partnership and 100% native owned company. This company has been established on 6th April 1993 and has quite extensive experience in the construction sector especially civil engineering and electrical. A.H. Ayub Enterprise is a company registered under the Malaysian Construction Industry Development Board (CIDB), SSM Business Registration certificate, Ministry of Finance Malaysia Company, and Bumiputera Company Ministry of Finance Malaysia.

A.H. Ayub Enterprise is a Malaysian Construction Industry Development Board-registered company (CIDB). It is grade G1 certified in categories B (Building Construction) and CE (Civil Engineering Construction). The company specializes in B02, B04, B07, B08, B09, B12, B13, B14, B15, B18, B24, B26, and B28 in category B (Building Construction). On top of that, the company specializes in CE01, CE06, CE13, CE14, CE19, CE20, CE21, CE31, CE34, CE36, CE42, and CE43 in the category CE (Civil Engineering Construction). A.H. Ayub Enterprise is also recognized in grade G2 in the ME (Mechanical and Electrical) category, with specializations in E03, E04, E06, E07, E10, E11, E16, E17, M01, and M15. A.H. Ayub Enterprise, in addition to being registered with CIDB, also holds SSM Business Registration certificate (000931542-K), Ministry of Finance Malaysia Company (K10344543902043405), and Bumiputera Company Ministry of Finance Malaysia (BP10344543902082091).

For almost 28 years, the company has been in field of construction and always provide the excellent service to their client no matter in what current economic situation because A.H. Ayub Enterprise's mission is providing the best quality in construction engineering service for all public and private sectors. Nowadays, A.H. Ayub Enterprise is one of the F/G1 and G2 Class Contractor company that selected and known in most private and public sector. Finally, this company also has highly trained, experienced, and supportive technical staff that dedicated to continuing to provide the best service to the company and its client.

2.2 Company Profile

The company relevant information are stated in the table below.

Company's Name	A.H. Ayub Enterprise
Company's Registration No.	000931542-K
Address	No 7A, Jalan Pelangi 2, Taman Pelangi Jaya, 51000 Wilayah Persekutuan Kuala Lumpur, Malaysia.
	 <p>Figure 2.2.1: Location of the company based on the Google Map.</p> <p>Source: https://www.google.com.my/maps</p>
Telephone Number	019-283 3326
Business Status	Partnership
Business Type	Construction And Service Contractors
MOF Registration No.	K10344543902043405
MOF Validation	26/08/2018 – 25/08/2021
PKK Registration No.	1961007-WP008164
PKK Validation	24/02/2021 – 15/04/2024
Registration Grade	G1/Class F & G2
CIDB Registration No.	1961007-WP008164
CIDB Validation	22/02/2021 – 15/04/2024
Categories	B, CE, ME & ME.
Registered Specialization	<ul style="list-style-type: none"> • B02, B04, B07, B08, B09, B12, B13, B14, B15, B18, B24, B26 & B28 • CE01, CE06, CE13, CE14, CE19, CE20, CE21, CE31, CE34, CE36, CE42 & CE43

	<ul style="list-style-type: none"> • E03, E06, E07, E10, E11, E16, E17, M01 & M15 • E04
Bank Information	<p>Bank: Maybank</p> <p>Branch: Jalan Tun Razak</p> <p>Account Number: 564052114409</p>

Table 2.2.1: The table of Company Profile.

2.2.4 Company Organization Chart

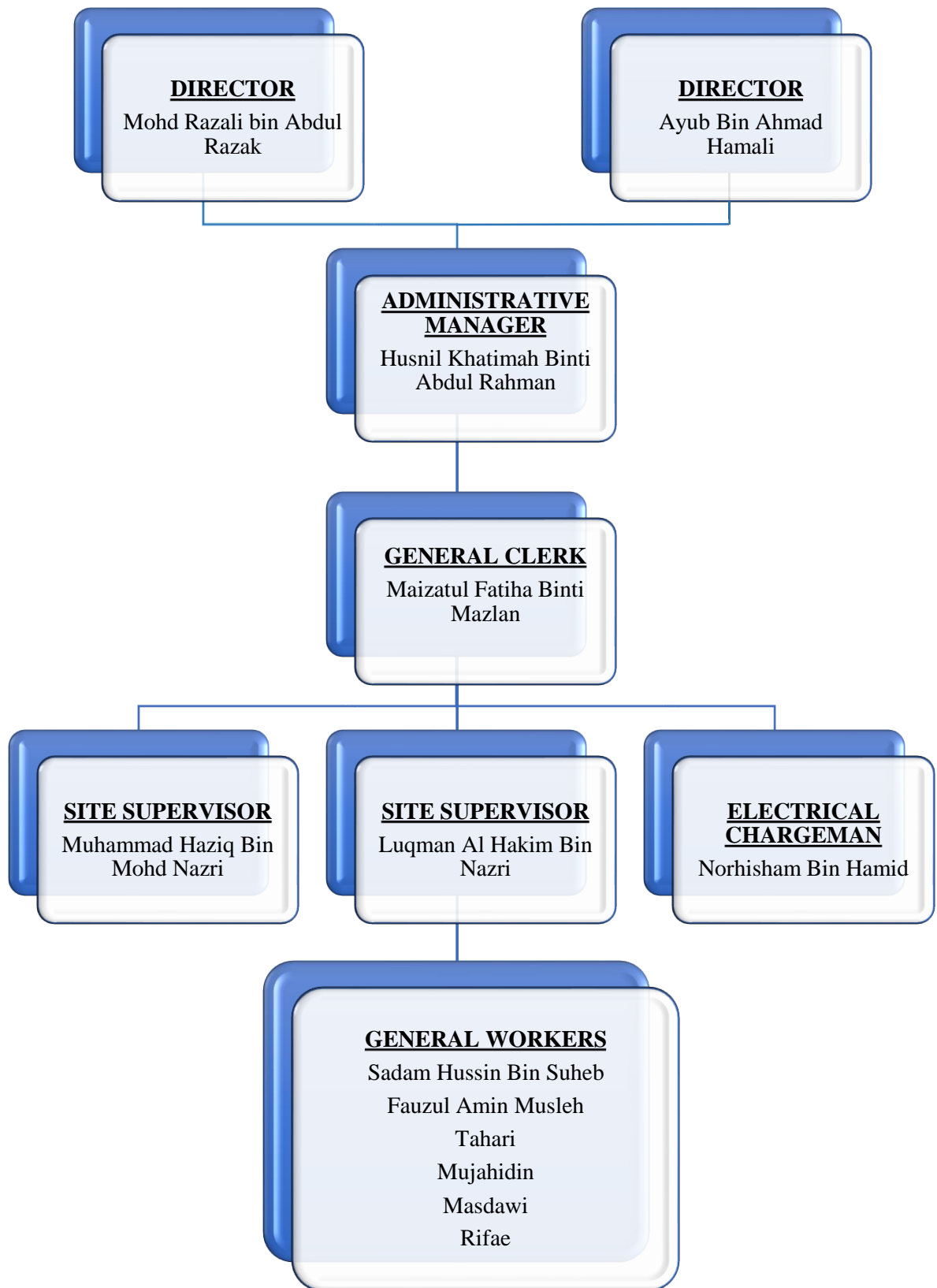


Figure 2.2.4: Company Organization Chart.

2.4 List of Projects

2.4.1 Completed Projects

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Kerja-Kerja Penyelenggaraan Bangunan Serta Kerja-Kerja Berkaitan SMK Puteri Ampang, Kuala Lumpur.	Forty-Nine Thousand Nine Hundred- and Ninety-Seven- Ringgit Malaysia (RM 49,997.00).	4 th October 2021	17 th November 2021	6 Weeks	JPWPKL
2.	Cadangan Kerja-Kerja Mengecat Permukaan Dinding Luar Di Blok 1 (Fasa 2), Apartment Taman Sri Murni, Selayang, Kuala Lumpur.	One Hundred Thousand Malaysian Ringgit (RM 100,00.00)	14 th July 2021	28 th September 2021	12 Weeks	DBKL
3.	Kerja-Kerja Pembaikan Di Bilik Moto Lift Serta Memasang Ventilator Fans Di Kompleks Profesional Baitulmal Taman Maluri Cheras Kuala Lumpur.	Twenty Thousand Malaysian Ringgit (RM 20,000.00)	6 th October 2021	18 th October 2021	3 Weeks	MAIWP

4.	Kerja-Kerja Penyelarasan Pemindahan Unit Flying Skuad/Skuad Tandas Bergerak/Skuad Logistik Di Jalan 1/48G & Bawah Jambatan Duke (Jalan Sinar Sentul), Kuala Lumpur.	One Hundred Ninety Thousand Malaysian Ringgit Only (RM 190,000.00)	29 th December 2020	23 rd February 2021	8 Weeks	DBKL
5.	Cadangan Kerja-Kerja Senggaraan Paip Kumbahan Dan Kerja-Kerja Berkaitan Di Bangunan JKR 852, Jabatan Arah Urusan Gaji Angkatan Tentera (UGAT) Di Kem Kementah, Jalan Padang Tembak, Kuala Lumpur.	One Hundred and Sixty Thousand Malaysian Ringgit (RM 160,000.00)	7 th April 2021	28 th July 2021	12 Weeks	JKR

Table 2.4.1: The table of completed projects.

2.4.2 Project in Progress

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Kerja-Kerja Senggaraan Di Bangunan BPS TD, Kem Kementah, Jalan Padang Tembak, Kuala Lumpur.	Eighty Thousand Malaysian Ringgit Only (RM 80,000.00)	22 nd October 2021		12 Weeks	JKR
2.	Kerja Senggaraan Rkat Blok JKR 1572 Bagi Pasukan Perumahan Wardieburn, WP Kuala Lumpur	One Hundred Thirty Thousand Malaysian Ringgit (RM 130,000.00)	23 rd October 2021		12 Weeks	JKR
3.	Kerja-Kerja Penyelenggaraan Tangki Serta Kerja-Kerja Berkaitan di SMK Taman Tun Dr. Ismail, Kuala Lumpur	Twenty Thousand Malaysian Ringgit (RM 20,000.00)			6 Weeks	JPWPKL
4.						
5.						

Table 2.4.2: The table of projects in progress.

CHAPTER 3.0

CASE STUDY (METHOD OF RENOVATING SCHOOL TOILET)

3.1 Introduction to Case Study

The case study is about renovating a school toilet. The project has started on 13th September 2021 and completed on 24th October 2021. The cost of construction approximately Forty-Nine Thousand Nine Hundred- and Ninety-Seven-Ringgit Malaysia (RM 49,997.00). At this time, the project is already finished. Thus, the study will be explained not only regarding installation but including the machinery and tools, the time that have been carry out and the problem and solution of the construction. Nevertheless, the study does not concentrate on cost matters and manpower. The site location took place at the SMK Puteri Ampang, Jalan Ampang, Kampung Datok Keramat, 55000 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.



Figure 3.1.1: The image of the site location based on the Google Maps.

Source: <https://www.google.com.my/maps>

This project is initiated because of the condition of the school toilet. Before the renovation, the school toilet is in poor condition. In other word, the school toilet consist of having bacteria, mold and rust water effect on the tiles and the toilet bowl. Because of this, the toilet is considered dirty and unpleasant to be used by the student. On top of that, it will make the school's name to be degraded because it will be the talk of the student and teacher. The poor condition of the toilet happen because the school neglect cleaning their toilets. If the toilet hygiene are abandoned, then it will lead to some more significant problems down the road such as the buildup of harmful bacteria mold and rust water effect.

As assigned in SMK Puteri Ampang, the toilet consist of having 4 toilets cubical. Each cubicles used the old squat toilets, 38mm thick PVC door, and wood door frame. In this site, there are many works that involve such as demolishing, waterproofing, rendering, and replacing. While being tasked in supervisor team, much knowledge about toilet renovation was gained. Focusing on method on toilet renovating process, the case study will take investigate on how the toilet is being renovated and finished. This case study also will investigate the problem while doing toilet renovating such as defect, obstacle, and problem might occurred with their solution to solve the problem.

3.2 Project Background

The project located at SMK Puteri Ampang, Jalan Ampang, Kampung Datok Keramat, 55000 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur. To be specific, it's a female student's toilet that is located on the first floor of the school's main block right beside the main stairs. The activities that have been carry out on the site is renovation. In other word, the activities that have been carry out is replacing the old and out fashioned tiles, toilet bowl, and door to the brand new and modern design.

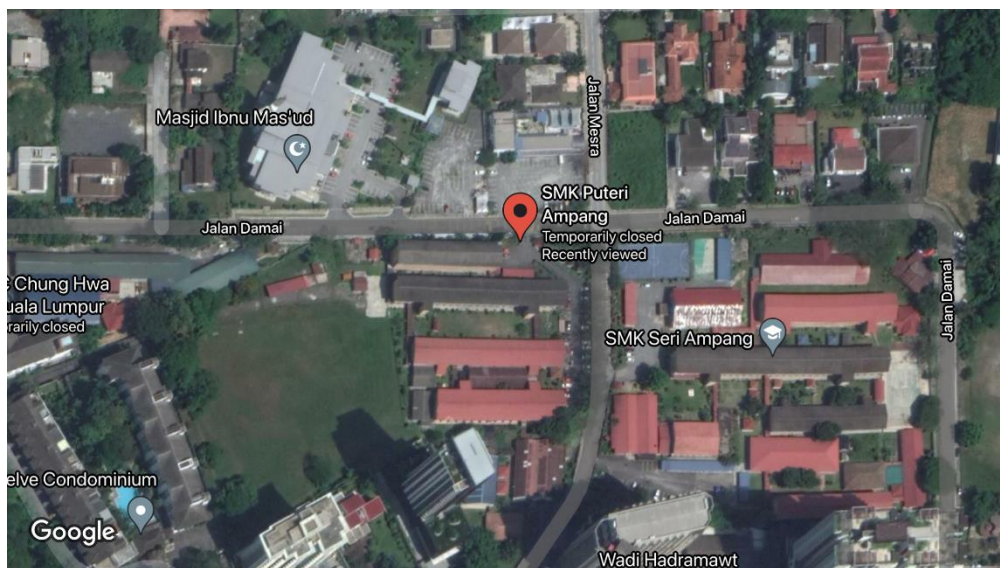


Figure 3.2.1: Location of site based on the Google Map.

Source: <https://www.google.com.my/maps>

This project that has been assigned by Jabatan Pendidikan Wilayah Persekutuan Kuala Lumpur (JPWPKL). The title of this project is *Kerja-Kerja Penyelenggaraan Bangunan Serta Kerja-Kerja Berkaitan SMK Puteri Ampang, Kuala Lumpur*. The agreed price that has been contracted in the tender was Forty-Nine Thousand Nine Hundred- and Ninety-Seven-Ringgit Malaysia (RM 49,997.00). The duration of the project that has been given by the JPWPKL is 6 weeks. The starting date to begin the work is the project is 4th October 2021 and it has been completed on 17th November 2021. In the tender document and the BQ, the project are not only focused on the toilet renovation, but also the maintenance and service of the school's library and *Surau*. However, in this report, the only work that is focused on is toilet renovation. According to the BQ, the total price only for the toilet renovation is Thirty-One Thousand Four Hundred Thirty-One and Twenty Cent Ringgit Malaysia (RM 31,431.20).

3.3 Method Statement of Toilet Renovation

The chart below shows the method statement of renovating school toilet in sequence.



Figure 3.3: Method Statement of Toilet Renovation.

3.3.1 Site Visit

Site visits are a component of the tendering process. It involve visiting the site where the services are going to deploy, for the purposes of gaining in-depth information. During the site visit, the school toilet is observed. In the observation, the toilet space, state, condition, and the time to finish the project are examined. Besides that, the manpower, tools, and machineries can also be determined for example, a longer plug extension is needed to power the tools and machineries because the toilet did not have any outlet nearby. Time is very important for the success of a renovation. By referring the tender document of the work, the time that was given is 6 weeks. This uneasy work needs to be handled by skilled workers to deliver the work quality for satisfy the client. The machineries and tools that involved in this renovation are demolition hammer, drill, roller paint brush, wheelbarrow, trowels, hawks, bucket, and measurement tape. Without wasting any time, all fixtures are provided the day before the renovation start. The fixtures include 4 two-piece ceramic toilet, 4 aluminum door frame, 4 door leaf, 300mm x 600mm x 8mm anti-slip homogenous tiles, cement, and waterproofing liquid membrane. The color of tiles must be approved by the client. On top of that, the picture also can be taken to show the ‘Before, During, and After’ process to claim the payment from the JPWPKL.



Figures 3.3.1: The condition of the toilet's tiles, cubicles, and doors.

3.3.2 Site Preparation

Site preparation means demolishing, removing, and cleaning structures and fixtures to make way for new renovations. Based on this project, site preparation includes demolishing the old and worn-out tiles, dismantling, and removing the sinks, mirrors, old squat toilet and its cistern carefully, and cleaning the broken tiles, concretes, and debris from the site to do the further works. The first thing to do during the site preparation of this project is turn off the water system inside the toilet and removing the old door and its frame. After that, remove the squat toilet cistern. To remove it, the top cover of the cistern must be open and using the drill to unscrew the wall-mounted screw that connected to the wall from insides the cistern. After that, unscrew both flush valve lock nut and the water intake locknut, and the chisel can be removed spontaneously.

The next process is demolishing the old tiles. The correct way to demolish the old tiles is by using hammer and a bricklayer's chisel. It is the cleanest and the quiet ways to removing the tiles. But in this project, demolishing hammer are used to fasten the work. Besides that, under the COVID-19 situations, students are persuaded to learning online from home. Because of that, the sound of the demolition hammer is not a disturbance for some times. To demolish the tiles, the demolition hammer are used from the top of the wall mounted tiles, down to the bottom. During the demolition process, the naked wall are hacked or strike to create an exact technical bind between the structure and plaster on the next process.

After all the tiles are removed, the next process is removing all the squat toilet from all the toilet cubicles. To remove it, the first thing to do is cover the squat toilet's hole using old news paper to prevent any debris or fragment from entering it because it can cause damages like blockage or clogging. Next, demolition hammer are used to demolish the concrete around the squat toilet bowl and simply remove the toilet bowl. After that, demolish the toilet platform by using the demolition hammer to make the toilet cubicle surface flatten and even. Lastly, clean the toilet by remove the concrete fragment, fixtures, debris, and any types of trash away from the toilet, to prepare the site. Make sure to store the unequipped fixtures at a storage room given by the school's principal.



Figures 3.3.2.1: Before the Site Preparation.



Figures 3.3.2.2: During the Site Preparation.



Figures 3.3.2.3: After the Site Preparation.

3.3.3 Waterproofing

Waterproofing is the process of making an object or building waterproof or water-resistant, so that it is unaffected by water or resists water penetration. It is the process of creating an impermeable barrier on the surfaces of foundations, roofs, walls, and other structural components. The impermeable barrier's function is to prevent water from passing through. Water penetration can cause damage such as bug infestation, mold, and, in the worst-case scenario, structural failure. Furthermore, waterproofing maintains the strength and longevity of concrete surfaces in a building. Cementitious Waterproofing, Liquid Waterproofing Membrane, Bituminous Membrane, Bituminous Coating, and Polyurethane Liquid Membrane are some examples of waterproofing. The waterproofing type used in this project is cementitious waterproofing. Cementitious waterproofing is the name given to cement-based waterproofing. Cementitious waterproofing is also the most basic method of building waterproofing. Cementitious waterproofing materials are widely available from masonry product vendors. They're also simple to mix and match. Cementitious waterproofing is utilized in interior moist areas such as toilets. As a result, it does not go through the process of contracting and expanding.

However, there are numerous types of cementitious waterproofing. Two-component polymer modified cementitious coating, cementitious waterproofing slurry, rapid-setting hydraulic cement, and cementitious waterproof plugging compound are only a few examples. Cementitious waterproofing slurry is used in this project. It is a two-part polymer-modified cementitious waterproofing slurry for concrete and masonry. It is made up of a liquid polymer and a cement base mix with unique additives. The benefits of cementitious waterproofing slurry include its ease of application and availability at any hardware store or masonry supply shop. Aside from that, the coatings are applied in the same way that cement is mix it with water until it reaches the desired consistency and then apply it using a stiff-bristled brush. It is also nontoxic, making it safe for contact with drinking water, and it is not corrosive to steel or iron.

To begin the waterproofing process, clean the surface to eliminate all dust, loose particles, and contaminants. The surface should be scrapped to make it smooth, and the walls should be brushed to remove undulations. Next, mark the height of the waterproofing place on the wall with tape at 4 feet and presoak the surface with water. Then, before applying the actual coating to the surface of the floor and wall, apply a primer layer. After that, begin mixing the two cementitious waterproofing slurry components, part A being cement and part B being

slurry or liquid, until a homogenous and lump-free slurry is achieved. After that, apply the waterproofing to the wall as high as 4 feet and as thick as 1.5 mm, and then to the floor as thick as 1.5 mm. After the first coating has dried for eight hours, repeat the process for a second coat of 1.5 mm thickness. The layers should be applied in a cross-directional manner and near one another. Run a water ponding test once the waterproof coating has dried. Begin by ponding the surface for 48 hours with water to a depth of 50mm. This determines the floor's watertightness. The test is considered good if there is no leakage and no damp patches on the floor's surface as measured by the depth of the water. The water-ponding test was passed with flying colors in this project.



Figures 3.3.3.1: The Cementitious Waterproof that are used in this project.

Source: <https://www.binapaint.com.my/product-2/>



Figures 3.3.3.2: The mixing Process of the Cementitious Waterproofing Slurry.



Figures 3.3.3.4: Before the Cementitious Waterproofing Slurry are applied on the wall.

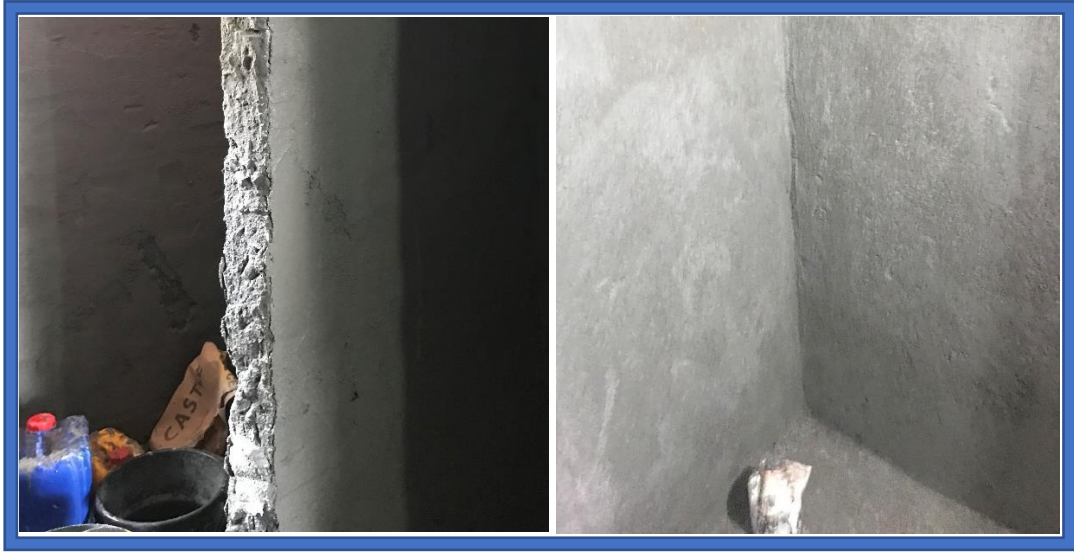


Figures 3.3.3.4: After the Cementitious Waterproofing Slurry are applied on the wall.

3.3.4 Tiles Installation

For the tile's installation, the type of tiles that are used in this project is 300mm x 600mm x 8mm anti-slip homogenous tiles. It is a type of ceramic tile made of fine porcelain clays that is burned at substantially greater temperatures than ceramic tile. This method produces homogenous tiles denser, tougher, and less absorbent than ceramic tiles, making them less responsive to moisture and stain absorption. It is used to enhance residential and commercial spaces, such as the kitchen backdrop, toilet, or the building's exterior walls. Besides including waterproof properties to keep them from getting wet and deteriorating and has rough surfaces that prevent slipping to safeguard the students, this characteristic ensures that the products persist a long time. The quality of these anti-slip homogeneous tile will ensure that the school toilet remains modern for a very long time.

The first thing to do after the cementitious waterproof has dried, is render the wall with 25mm thickness of sand and cement mixtures to attain a smooth or textured surface. It is similar in technique to plastering. After it dried, start by mixing the tiles adhesive by Mix the adhesive into the water, then add additional adhesive or water as needed to achieve a thick consistency like the richness of thick peanut butter. Swirls at the bucket's top to let it to stand upright without slumping or disappearing and apply it onto the walls. Once the thinset is ready, begin by applying it with the notched trowel to the substrate or underlayment. Grooves will be left on the substrate and tile by the notched trowel. To produce a consistent mortar bed beneath the tile, ensure that all of these are going in the same direction. Hold the trowel at a 45-degree angle while the thinset spreads to create a thick enough layer. Next, apply strong, uniform pressure when setting a tile in thinset. Wiggle the tile back and forth a few times to allow the thinset ridges to break down and fill in the valleys. This results in a thick layer of thinset beneath the tile. Use spacers between tiles to maintain a consistent gap and grout lines throughout the installation. After the thinset cures, the spacers should be able to be removed. Lastly, clean any extra thinset squeezed out and in grout joints to prepare the space for grouting. Using a grout float, begin applying the grout. A grout float is a spatula-like flat rubber or silicone instrument with a flexible edge. Hold it at a 45-degree angle and approach the grout line diagonally. Make sure to properly fill in the joint from top to bottom. Repeat the same process onto the floor.



Figures 3.3.4.1: The rendering before and after it dried.



Figures 3.3.4.2: During the tile's installation.

3.3.5 Fixtures Installation

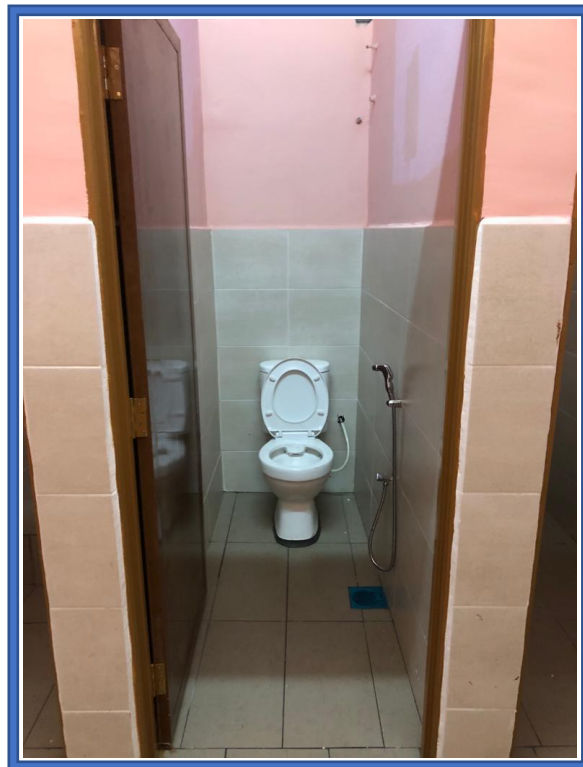
For the next method is fixtures installation. In this project, there are 3 fixtures that need to be installed. Started with ceramic two-piece toilets, Aluminum door frames, and door leaf. For the installation of ceramic two-piece toilet, the first thing to do is install the toilet flange to the drainpipe in the finished floor and drill the bolt hole aligned for the new toilet. Next, apply the new toilet seal by place the new toilet bowl on its side on a padded area to protect the floor and the toilet from breaking or cracking, and then attach the replacement seal to the bowl's bottom. The advantage of this method is that it can be certain that the ring is in the appropriate position when placing the toilet over the flange. After that, place the toilet bowl on the flange, matching the bolt holes in the bowl's base with the flange's bolts and place a washer and nut on each toilet bowl bolt and equally tighten the nuts onto the bolts and carefully not to over-tighten the nuts and crack the bowl. The next step is attaching the tank to the toilet bowl. Install the "cistern to bowl" gasket to the flush valve's base by insert the tank bolts and washers from the inside of the tank. Next, connect the shank of the bolts with the holes in the bowl and fasten the tank to the bowl by alternately tightening each tank bolt until the tank pulls down and meets the bowl. Finally, reconnect the supply line to the exposed section of the fill valve that extending out of the tank's bottom with the supply valve coming out of the wall, and install the toilet seat and lid. For the finishing, plaster around the toilet bowl to the finished floor.

For the installation of aluminum door frame and the door leaf, start by insert the door frame into the rough opening of the door and place the frame in the center of the opening. Next, hold on a bubble level against one of the vertical sides of the door frame and adjust the vertical side until it is plumb, using the bubble level as a guide. Insert shims between the plumb side of the door frame and the rough opening in the cubicles. Tack the plumb side of the Aluminum doors' frame to the rough opening in the cubicles. with 3-inch screws, tighten the screws with a drill. Install a screw 8 inches from the top and bottom of each side of the frame. Then, use 3-inch screws, secure the aluminum door frame to the rough opening in the cubicles. Install a screw 8 inches from each side of the frame as well as in the center. After that, lay the bubble level on the top of the door frame. Adjust the top of the door frame until it is level in the rough opening, using screws to raise or lower the frame as necessary. Tightening the screws lifts the frame, while loosening them lowers it. Insert shims between the side of the door frame and the rough opening. Then, use 3-inch screws to hold the remaining side of the frame in place, placing a screw 8 inches from the top and bottom of the frame and in the middle. And

lastly, Install the 38 mm PVC doors to the door frame. Close the doors and inspect the gaps on both sides.



Figures 3.3.5.1: Before the fixtures are installed.



Figures 3.3.5.2: After the fixtures are installed.

3.3.6 Finishing

The last method of renovating school toilet is finishing. What it mean by ‘finishing’ is preparing the toilet to be used by the citizens of the school. To be specific, the toilet are tidy-up, or beautify, improve, and inspect. In the first process of the finishing, the toilet are tidied-up or beautified. Firstly, remove the rust stain on the walls using paint with the same color of the toilets wall. Besides that, cleaning the features that was dismantled and set it back to the original places. For example, the sinks, and the mirrors. After that, cleaning the debris of all the fixtures. For instance, clean the new tiles by using muriatic acid. Since muriatic acid is a harsh chemical, mix it outside with five parts waters. Follow the warning and instructions on the bottle and be sure to wear rubber gloves. Repeat the same process to the other fixtures like the two-piece toilet and sinks.

After the beautify process is improving. The toilet can be improved by changing the old and cheap parts with the new one. For instance, the floor drains, faucet, and the hand bidets are replaced with the new and fresh version. This is to give the toilet the complete look and attain the excellent customer services just to prove the quality of the company’s work. Later on, throw all the garbage away from the school properties. Last but not least, the last thing to do is inspecting. Inspection is the most important part of the project. It is to make sure all the fixtures did not have any faults and error. For examples, toilet clogging, and fixtures did not work. To inspect it, turn the toilet water system on and let the water fill the toilet cistern. While wait for the water to fill it, turn the hand bidets, and sinks water on to make sure the water run smoothly, and the sinks did not have any leaks underneath. After that, flushes the two-piece toilets to make sure the toilets works. Check the toilet to see if there’s any leakage. After the inspection going smoothly, inform the client that the project has been done and let the client inspect the toilet. Finally, turn over the site’s key to the responsible party.



Figures 3.3.6.1: The toilet exterior during the project.



Figures 3.3.6.2: The toilet exterior after the project.

3.4 Problems faced during conducted

Problem: Damaged the Unequipped Fixtures

The unequipped fixtures that need to be installed back to their original places during the finishing are damaged. To be specific, a ceramic sink accidentally fallen off and crashed during the storing process. This is because the inattention performance. The accident must be reported to the school's authorities until came to an agreement for settle the fault.

Solution: Compensate

The great solution for the problem above is compensate the damaged that has been caused. Compensate by buying the new set of sinks and equipped it cautiously to repay the damaged that has been caused and make sure to be very efficient and well-organized. Besides that, learn from the mistake to prevent the same accident occur in the time to come.

Problem: Lost the Unequipped Fixtures

The unequipped fixtures that need to be installed back to their original places during the finishing has missing. To be specific, a sink faucet was missing in the storage room. This is because the lack of awareness to lock the storage room if it's not occupied. It is very important to safeguard the storage room precisely because the room contains the item that needed for the project.

Solution: Reimburse

The excellent solution for the problem above is Reimburse the lost item. Reimburse by buying the new sink faucet and equipped it carefully to repay the item that has been missing and make sure to be very well-aware and well-managed. Besides that, improvise the situation by execute the project satisfyingly to maintain the great services.

CHAPTER 4.0

CONCLUSION

The toilet are one of the most important parts in any building because it is used for privately accessing the sanitation fixture for urination and defecation. Because of that, Toilet renovation are important to help in creating additional space, reducing energy usage, and preserving the cultural past while bringing the building up to the most recent technical requirements. There are numerous reasons for renovation, the most essential of which is to improve living comfort and indoor environment. The method of renovating school toiler was started from the site visit, site preparation, waterproofing, tiles installation, fixtures installation and lastly finishing.

The process of the school toilet renovation took around 5-6 weeks starting from 4th October 2021 until 17th November 2021 with the related work. The renovation of the school toilet delayed a few days because of the *Maulidur Rasul* and Deepavali holidays. However, the work was done satisfyingly, and the client was pleased with the quality and the service provided by the company. The method of renovating school toilet are simple but time-consuming. With patience and dedication, the project will operate smoothly. Although some problems are arisen during the renovation, such as lost and damaged the unequipped fixtures, the quality of the project still maintained because of the great solution that satisfied both side without wasting much money.

In conclusion, the methods of renovating school toilet are some familiar methods that has been combine into one project and it is similar to the theory. There is nothing that carried out differently during the toilet renovation except for the tile's installation and waterproofing method. Besides that, all the procedures that has been carried out during this project are learnt throughout the semesters.

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