DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

INSTALLATION OF CERAMIC TILES

Prepared by:

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AUGUST 2021

By

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entitled

Installation of Ceramic Tiles

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

Report Supervisor	:	Cik Nor Azizah Binti Talkis
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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 stated herein, prepared during a practical training session that I underwent at Exxomas Sdn Bhd for duration of 20 weeks starting from 06 September 2020 and ended on 10 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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UiTM ID No : 2019205442

Date : 27/10/2021

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Alhamdulilah, praise to Allah S.W.T who gives us the ideas, physical and emotional strength to finish prepared this thesis.Completion of this thesis requires more than just an effort.Special appreciation goes to my project coordinator, Dr. Dzulkarnaen Bin Ismail , for his continuous support and supervision. and given me the guidance on how to complete this thesis. I would like to express my appreciation and acknowledgment to my site supervisor Encik Jazlan Binti Majid. He have helped me a lot with additional information and tips when needed. Not forgotten to all our technicians and office staff in AgroBina Enterprise, they give alot of support to success to this thesis. Thanks also to my Practical Training Coordinator Dr Nor Asma Hafizah for their guidance, advice and moral support while doing this report successfully. Thank you for your concern in making sure to be a success in the training. Not Forgotten, big appreaciation go to the Report Supervisor Ms Hasni Suryani Binti Mat Hassan and Faculty Coordinator Miss Azizah. Besides, thank you for always making my thesis easier, completing and understanding exactly what the work is about and always giving me time to understand it.Thank you also who involve in this thesis. I hope thesis will be receive and hope my effort was worth it.

Thank you very much

ABSTRACT

This report frequently describe about installation of ceramic tiles, equipment and tool that be used and maintenance of ceramic tiles. It is produced according 4 months experience at a construction site.the objective of this report is to identify about installation of ceramic tiles, equipment and tool that be used and identify the maintenance ceramic tiles. In this report has three method of study to obtain the information. First is observation method that perform when go to site observe the surrounding. Second is interview method, interview a person who experienced in the work of construction.Then, document review method like reading document company. The finding from this report in installation of ceramic tiles is begin with setting out, excavate the soil, install reinforcement and pad foundation, install concrete piller ,concrete the slab and install the ceramic tiles. Hope this report can give a advantage to the reader on how to install the ceramic tiles and equipment and tool that be used and also the maintenance.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

The construction industry in Malaysia is a vital and productive sector of the Malaysian economy. Malaysia, as a growing country, has recognize the importance of the construction sector not only in economic growth but also in increasing the quality of life and living standards of Malaysians.

The construction sector has measures and scopes that need to be adhered to by contractors from clearances site to finishes on building. Then, the installation of ceramic tiles belongs to the finishing steps of the building. Ceramic tiles are made from clay and other natural resources like sand, quartz, and water. They come in a variety of colors and patterns to further enhance a surface.

Last but not least, the main reasons why Malaysians choose ceramic as their tiles because ceramics are strong and resistant to high temperatures and acidic materials. They are generally utilized as bathroom wall and kitchen floor surfaces in homes, restaurants, businesses, and retail establishments. Then, they are simple to install, clean, and maintain, and are reasonably priced.

1.2 Objective of Studies

i. To identify installation of ceramic tiles

ii. To identify the equipment and tool used for installation of ceramic tiles

iii. To determine the maintenance on ceramic tiles

1.3 Scope of Study

The scope of study only focused on installation of ceramic tile, equipment and tools used to install ceramic tile and maintenance on ceramic tiles for Surau Cheneras Jaya, located in Taman Cheneras Jaya 1, 27200, Kuala Lipis, Pahang.

1.4 Method of Studies

There are three method of study that were used to get the information and data for complete this report.

i. Observation method

This observation methods are performed while visiting a construction site. The way this method is carried out is to observe the ongoing construction process and record it using a mobile phone camera. The image is the evidence and data that the process takes place like the image during the site clearance process.

ii. Interview method

This interview method is carried out by interviewing a person to obtain information. the person being interviewed should be someone who is knowledgeable and experienced in the field of construction so that the information is not wrong and doubtful. Such as interviewing engineers, site supervisors, contractors, and project managers. The interview session should be recorded using audio record so that the information is not dropped and can be recorded in the report easily. Finally, this method helps to get more detailed information and data for a process.

iii. Document review method

This method is carried out by reading the company's documents, to obtain information about the company and ongoing projects. Among the documents reviewed are company background information, Bill quantity documents and some project plans.

CHAPTER 2

COMPANY BACKGROUND

2.1 Introduction of Company

Company name	: AGRO BINA ENTERPRISE
Registration no	: 1970227-PH023
Registration date	: 24/02/1998
Company address	: NO-1, TAMAN LIPIS BARU, 27200, KUALA LIPIS, PAHANG
No. Tel	: 09 - 3121991
No. Fax	: 09 - 3125008
Email	: agrobina@yahoo.com
Business	: General Contractor & Renovation
Business status	: Sendirian Berhad
Owner	: Encik Baderu Khisam

2.2 Company profile

2.2.1 Certificate of registration from (CIDB)

Registration No. of SPKK :1970227-PH023

Table 2.1 about Contractor registration system(CIDB)

GRADE	CATEGORY	SPECIALIZATION
G1	B	B01,B02,B04,B14,B24
G1	CE	CE01,CE08,CE21,CE34,CE36,CE43

2.2.2 Company Logo

Photo 2.1 about Company logo

Source : Agrobina company

2.2.3 Appendix

CIDB MALAYSIA

PERAKUAN PENDAFTARAN

Adalah dengan ini diperakui bahawa kontraktor yang dinyatakan di bawah ini telah berdaftar dengan Lembaga mengikut Bahagian VI Akta Lembaga Pembangunan Industri Pembinaan Malaysia 1994. Pendaftaran ini adalah tertakluk kepada syarat-syarat yang telah ditetapkan bersama perakuan ini.

No. Pendaftaran	:	1970227-PH023757
Nama Kontraktor	:	AGRO BINA ENTERPRISE
Alamat Berdaftar	:	NO. 1, TAMAN LIPIS BARU 27200 KUALA LIPIS PAHANG
Daerah	:	LIPIS
Tarikh Mula Berdaftar	:	24/02/1998

GRED	KATEGORI	PENGKHUSUSAN
G1	B	B01 B02 B04 B14 B24
G1	CE	CE01 CE08 CE21 CE34 CE36 CE43

Tarikh Mula Berkuatkuasa : **16/12/2019**

Tarikh Habis Tempoh Perakuan : **29/03/2023**

STATUS: AKTIF

Ketua Eksekutif
Lembaga Pembangunan Industri Pembinaan Malaysia
Tarikh: 16/12/2019

Photo 2.2 Perakuan Pendafataran Company (CIDB)

2.3 Company Organization Chart

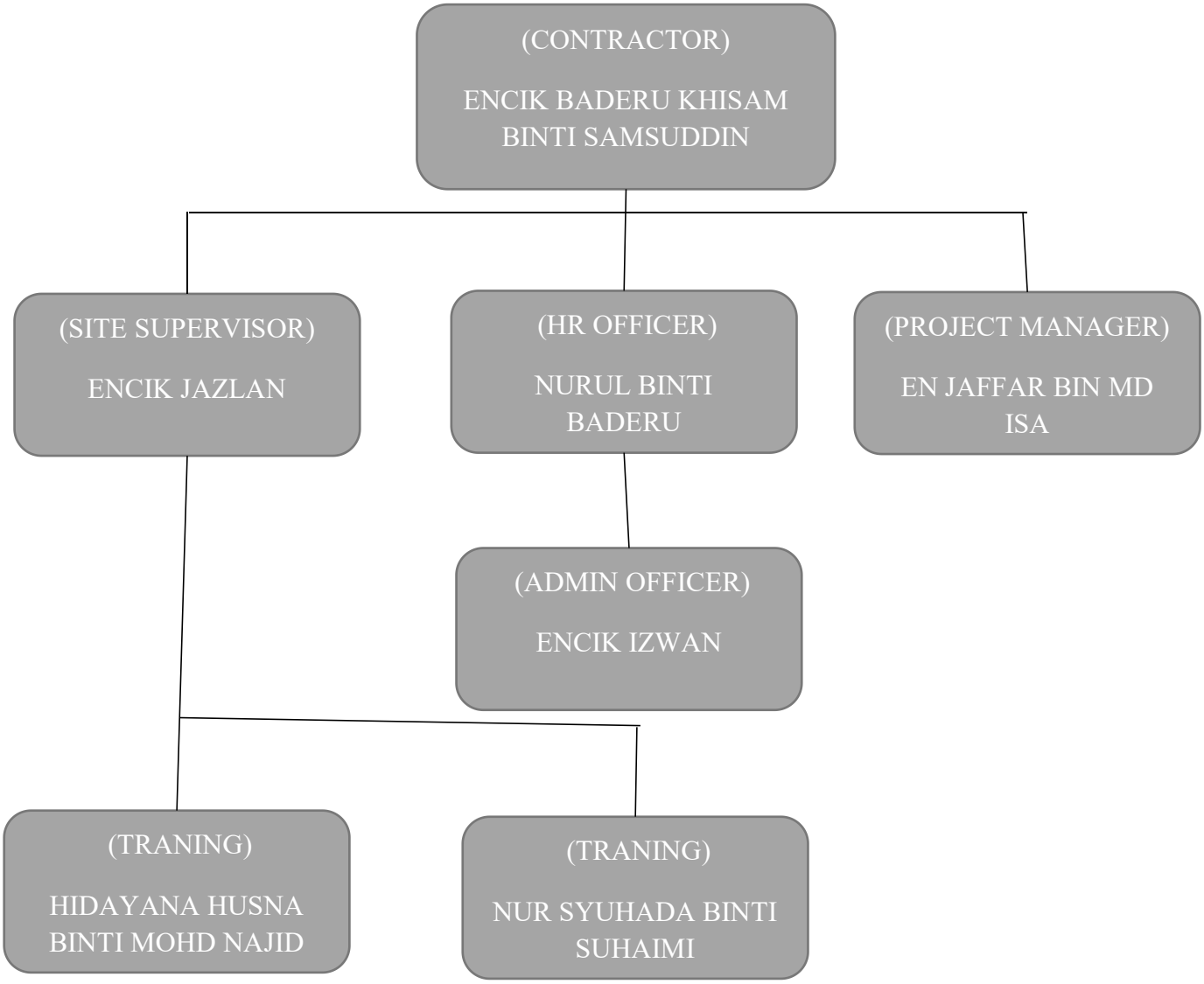

Table 2.2 Chart Organization of Scope Job in Company

2.4 Project List

No	Project	Status
1	Road maintenance (premix) in Jalan Budu, Benta estate, 27200, Kuala Lipis, Pahang	Complete
2	Construction and upgrading of men's toilets and related works at the Masjid Besar Kuala Lipis	Incomplete
3	Construction and upgrading of suraus and related works at the Surau Cheneras Jaya, 27200, Kuala lipis	Complete
4	Road maintenance (premix) in SK Wan Ibrahim, Kuala Lipis, 27200, Kuala Lipis, Pahang	Complete
5	Road maintenance (premix) in Jalan Taman Permai, 27200, Kuala Lipis, Pahang	Complete
6	Road maintenance (premix) in Jalan Kampung Lubok Kulit, 27200, Kuala Lipis, Pahang	Complete
7	Road maintenance (premix) in Jalan Kampung Senderut, Perkampungan Orang Asli, 27200, Kuala Lipis, Pahang	Complete
8	Road maintenance (premix) in Jalan Taman Emas, 27200, Kuala Lipis, Pahang	Complete
9	Construction and installation of culverts in Jalan Padang Tembak, Tempoyang 27200, Kuala Lipis, Pahang	incomplete
10	Road maintenance (premix) in Perumahan Klinik kesihatan Padang Tengku, 27200, Kuala Lipis, Pahang	Complete

Table 2.3 about Construction Project list

2.4.1 Construction and Renovation project

I. Complete Project

Proposed to renovation to further enlarge the prayer line of the surau with a base size of 15m x 8.7 m at the top and 10.7 m x 9.6 m L -shaped at the bottom at Surau Cheneras Jaya , Kuala Lipis, Pahang. The total amount of this construction is RM 185,020.

Photo 2.3 Front elevation the prayer line of the surau

II. Ongoing Project

Proposed to renovation and upgrade of men's toilets and related works at the Masjid Besar Kuala Lipis. The total amount of this construction is RM 178,300.

Photo 2.4 progress renovation of men's toilets

Proposed to install the culvert along the road of Jalan Tembak, Tempoyang which is 67 m in length .

Photo 2.5 86% progress installation of culvert

2.4.2 Road maintenance (premix)

Photo 2.6 Jalan Perumahan Taman Permai

Photo 2.7 Jalan Besar Budu, Benta Estate

Photo 2.8 Jalan Perumahan Klinik Kesihatan Padang Tengku

Photo 2.9 Jalan Perumahan Orang Asli, Senderut

CHAPTER 3

INSTALLATION OF CERAMIC TILES

3.1 Introduction

This case study describe the whole method to installation the ceramic tiles and how to maintenance the ceramic tiles . There are many tiles that Malaysian choose for their finisher floor but for this study case only for ceramic tile and how the process to install, that located in Surau Cheneras Jaya, 27200, Kuala Lipis, Pahang. The project site is in Perumahan Taman Cheneras Jaya. Then this case study also focused on equipment and tools that be used and also describe the conclusion and recommendations of the installation of ceramic tiles.

Definition of tiles is a flat or curved piece of fired clay, stone, or concrete used especially for roofs, floors, or walls and often for ornamental work(Meriam,1989). There are many benefit when use ceramic tile as a tile for flooring like Ceramic tiles are one of the most durable types of tiles on the market, lasting 10-20 years with good care. A ceramic tile requires a lot of weight to shatter, don't have worry about cracks or dents from heavy furniture. Because it is robust and scratch-resistant, this type of tile is suitable for commercial settings and is one of the finest solutions for rooms and places with high foot traffic(Zothek,2019).

3.2 Background of the Project

Based on case studies, the project that has be choose in practical training is construction and upgrading of surau's and related works at Surau Cheneras Jaya, 27200, Kuala lipis, Pahang, Darul Makmur. Basically this renovation is to enlarge the prayer line of the surau.

The total amount of construction and upgrading of surau's and related works is RM 185,020 (One hundred Eighty five Thousand twenty Only). The period of this project is 3 month starting from 4 august 2021 until 13 October 2021.

In construction, to complete a project there are several people involved and responsible for completing it as in this project construction and upgrading of surau's and related works, the main contractor is AAFA Rezeki Enterprise and Pejabat Daerah and Tanah Lipis as a client. In addition, the Agrobina company is also responsible for carrying out the project because it has been selected to be the sub - contractor.

3.3 Case Study

3.3.1 Method installation of ceramic tiles

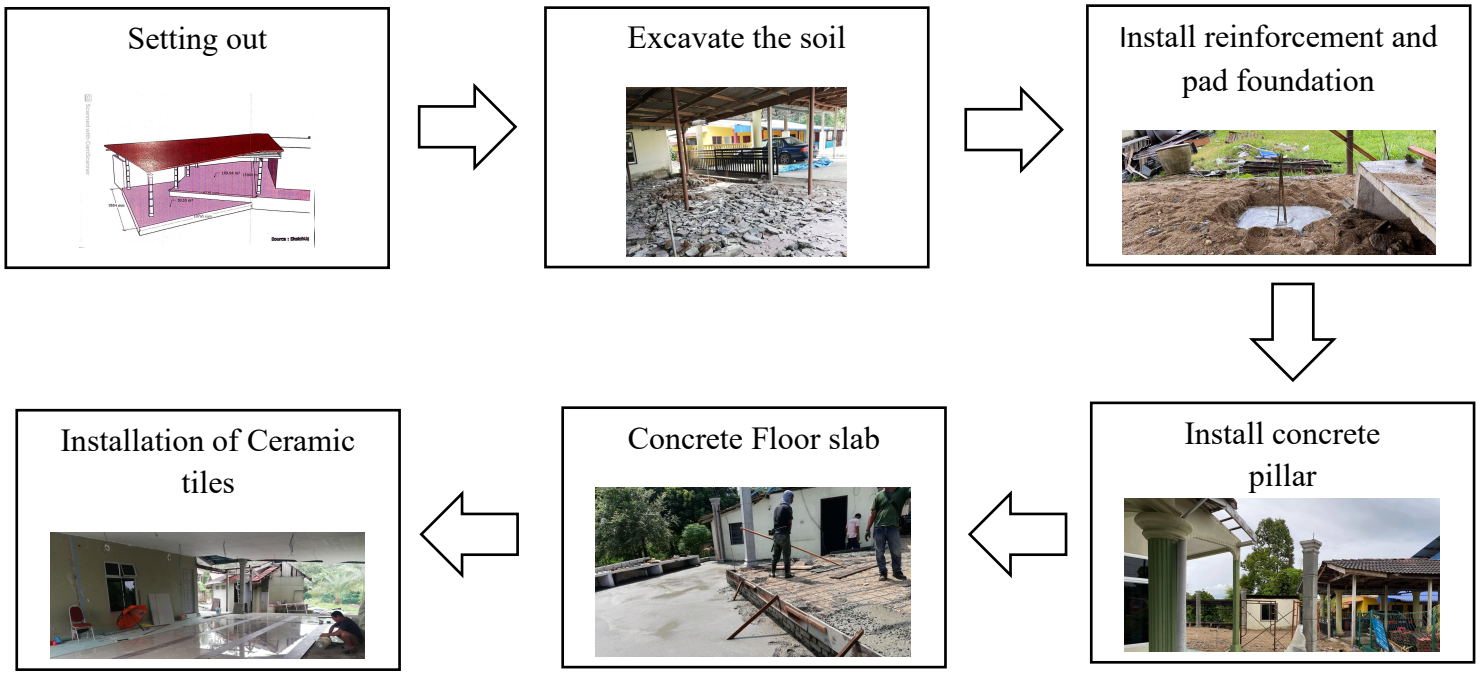

Table 3.1 Method installation of ceramic

3.3.1.1 Setting Out

Firstly, setting out is the first method in this construction. Setting out is process transfer from drawing plan into the ground. This process can establish the location point of site boundaries, foundations, columns and pole of this project. There are a few tools that should be used in the job of setting out, such as yarn.The length and breadth of the slab that is required must be decided first in the construction of installing ceramic tiles. In this project, the size of the slab that must be laid out is 15m x 8.7m for the top and 10m x 9.5m for the bottom. Then, the employers, engineers, and contractors will be among the groups participating in the detailed planning. Engineers will analyse the task that has been set out to undertake, but the contractor will be liable for it. The goal of setting out is to determine the exact dimensions of the size slab before beginning excavation operations.

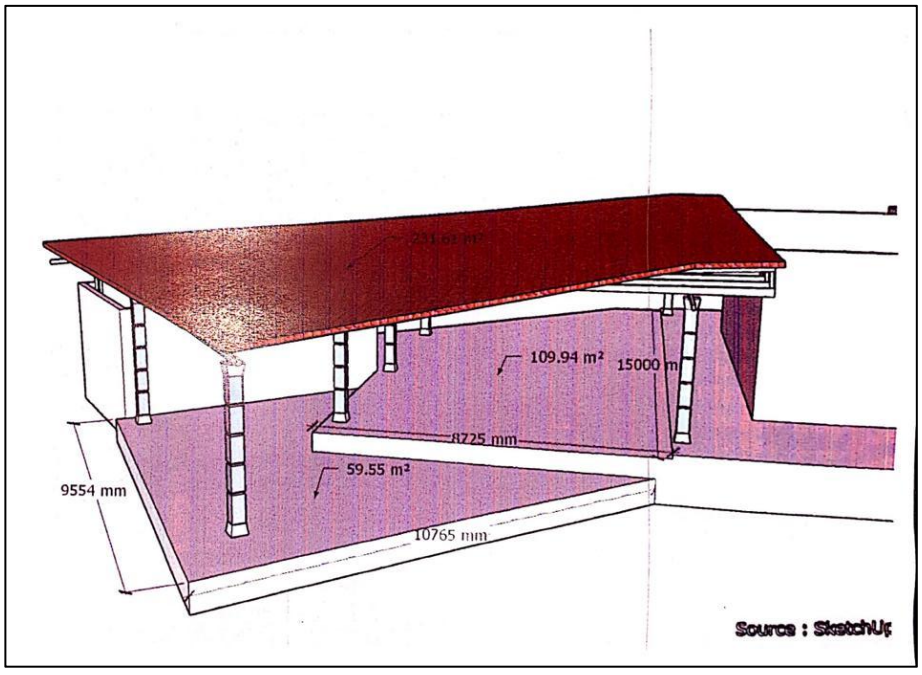

Photo 3.1 plan to do setting out ,Kuala Lipis, Pahang

3.3.1.2 Excavate the soil

The next method is excavate the soil. Before start to excavate the size of floor slab should be ensured. Based on plan, have two layer of slab one in top and another at the bottom.The dimension of slab for both layer is 15m x 8.7x and 10m x 9.6m. Actually before this the site had a mosaic floor and roof but this project is more to modify for further enlargement, so its excavate more to remove the old and add new and also enlarge again. So the old tiles should be broken when the excavate is carried out. The tool that be used to break the old tiles is jack hammer. The broken tile was collected and disposed of by the workers.

Photo 3.2 excavate the old tiles and soil, Kuala Lipis, Pahang

3.3.1.3 Install the reinforcement and Pad foundation

Pad foundations are typically shallow, but can be deep depending on ground conditions. They are a type of distributed foundation composed of rectangular, square, or occasionally circular concrete 'pads' that support localized single-point loads such as structural columns, groups of columns, or framed buildings.The pad then distributes this weight to the bearing layer of earth or rock beneath. Pad foundations can be utilize to support ground beams as well.

The function pad foundation to this construction is to support the concrete pillar cause this project is so open it has no walls. Foundation pad is very important if the installation method is not correct and does not follow the criteria set by JKR, there may be problems in the future such as the concrete pillar is not strong for a long time or cracks on the pole may occur.

Pad foundation can install after the excavate the soil has done. Refer to the plan to find out the position of the pad foundation then pegging and mark. Excavate the soil according to a predetermined pad depth as from the reduce level, down to the desired level.

After excavate, build the formwork of the pad foundation on the side and support it with additional wood to avoid the formwork from collapsing when the concrete is poured into it. Then, before the reinforcement is installed, spacer block are placed. This ensured that the rebars were adequately covered in concrete.

After that, stump reinforcement is erected. rebars should be extended above the stump level to serve as beginning bars for the column above.Then, pouring the concrete mix into the formwork but to avoid excessive water loss during hardening the concrete will set and curing will be required. When the concrete mixture has hardened , the formwork can be dismantled

Photo 3.3 reinforcement bar pad footing ,Kuala Lipis, Pahang

Photo 3.4 concrete pad foundation ,Kuala Lipis, Pahang

3.3.1.4 Install concrete pillar

Concrete pillar are now available in precast which is a prefabricated type. in Malaysia there are various forms that have been marketed. the use of concrete pillar is very popular to beautify the house, especially on the outside of the house, including with this project

After the completion of the foundation pad, a concrete pillar should be installed on it.Firstly, before installing it should be bricklaying within 2 feet of the foundation pad because to further strengthen the base of the pillar. After that place the pillar on top of it but make sure the hole of the pillar goes into the reinforcement.Finally when the pillar has been erected, fill the sand into the pillar.

Photo 3.5 Concrete pillar , Kuala Lipis, Pahang

3.3.1.5 Concrete Floor Slab

The next step after install the concrete pillar is concrete the floor slab. Before concrete the slab have several task to do. First, assamble the formwork for slab.The formwork must be built to endure construction loads such as new concrete pressure and the weight of workers, operators, and their equipment.It should be properly positioned, lined and levelled, joints suitably sealed, and nails should not protrude into the concrete.The materials such as wood, it be used for this the formworks of concrete floor slab.

Next, to get a flat surface for the slab it is necessary to lay sand and level it. Equipment for leveling to compact the sand is vibrating plate compactor. After that, placement of reinforcement for concrete floor slab construction.The forms must be cleaned and lubricated thoroughly, but not so much that they flow into the bars or concrete construction joints.Steel bars are installed in their placements with prescribed spacings and concrete covers.By using spacers and bar supports, the concrete cover and spacing for floor slabs may be maintained. Wires are utilised to connect the primary reinforcement.

Concrete mixing, transporting, and handling must be appropriately coordinated with placement and finishing activities. Begin laying concrete along the perimeter of the floor slab at one end of the job, with each batch set against previously dispatched concrete. After finishing is complete, an appropriate process must be utilised to effectively cure the concrete. Water cure is one of the slab curing procedures. In terms of curing, it is advised that formworks be removed after 14 days.

Photo 3. 6 concrete the slab, Kuala Lipis, Pahang

3.3.1.6 Installation of ceramic tiles

3.3.1.6.1 Method Install ceramic tiles

Tile is a visually appealing and low-maintenance flooring option. This phase will demonstrate how to lay tile from the first prep procedures to the final placement.

This installation is starting from plan tile out The first step in laying out tile is to draw a guideline or layout line in the room to ensure that the tile pattern is appropriately spaced.Then, the next step is determine square footage to estimate the amount of tile like to calculate the square footage of a room, multiply its length by its breadth then compare the tile size to the room size for an estimate of the amount of tile needed.

After that, mix the thinset mortar,thinset mortar is the cement or bonding agent used to bind tile to the floor. In a big bucket, mix the thinset mortar with the required amount of water using a thinset mortar mixer. Allow to stand for 5 to 10 minutes after mixing to set. This "slake period" permits the thinset mortar's ingredients to completely activate. Then applying the mortar. Apply a tiny amount of thinset mortar to the face of the tiles with the flat side of a square-notched trowel. Apply more to create a 1/2-inch thick layer of mortar.

Photo 3.7 applying mortar to tiles , Kuala Lipis, Pahang

Begin lay the tile then measure and cut the tiles. The final step in laying tile is mixing and applying grout. Grout fills the spaces between tiles.

3.3.2 Equipment and tools installation ceramic tiles

There several equipment and tools to applying the ceramic tiles. This equipment can further perfect the tidiness of installing ceramic tiles.

1. Manual cut cutter

It is lightweight and simple to use, making even the most difficult work a delight, and it can give increased cutting speed with just one hand. The cut is clean and accurate, and it has no effect on the surface material's quality, whether dealing with ceramic or glass.

Photo 3.8 Manual cut cutter

2. Mortar mixer

Tile mortar mixers come in a range of speeds and engines and are ideal for mixing cement, adhesives, paints, resins, and other materials. Getting the appropriate mortar consistency is critical to a successful tile installation. A good tile mortar mixer will not only make the procedure easier, but it will also assist to achieve a strong bond and, as a result, a long-lasting installation. As a general guideline, always double-check that used the correct paddle for the amount of mortar mix that used.

Photo 3.9 mortar mixer

3. Rubber bucket

Rubber buckets may be used to mix or transport mortar, but because they are made of rubber, they are easier to clean than plastic buckets. Even if the mortar is entirely dry, a rubber bucket will take less time to clean than a hard plastic bucket.

Photo 3.10 rubber bucket

4. Tile trowel

A tile trowel is an essential tile installation equipment if want the finished product to seem polished and professional. Regardless of the type of tiles used, whether ceramic or natural stone, a cement-based mortar must be used to secure them to the surface. To ensure that the tiles stick as evenly as possible to the wall or floor, the mortar must be levelled.

Photo 3.11 tile trowel

5. Tiles spacer

A tile spacer to get the ideal gap between tiles or even to segue into different patterns They adapt to many purposes such as T, crosshead, and line separator without breaking. They are made of high-quality, long-lasting materials that can sustain years of usage without deterioration.

Photo 3.12 tiles spacer

6. Rubber grout

A rubber grout float is made out of a strong yet flexible rubber pad attached to a C-shaped handle.Grouting is a critical component of the installation procedure. The surface would appear uneven and incomplete if it did not have it. Grout covers the gaps between the tiles and holds them together.

Photo 3.13 rubber grout

3.3.3 Maintenance ceramic tiles

Ceramic tiles floor is very popular for flooring option. Cause they very durable but like all floor, they need care and cleaning. There are several tips to maintenance the ceramic tiles.

3.3.3.1 Routine maintenance

A couple of times every week, sweep or vacuum the tile flooring. The surface can be dulled and scratched by sand and grit. When ready to mop, combine a light detergent with hot water and use a rag or chamois mop instead of a sponge mop. A sponge mop forces unclean water into the grout, contaminating it. Ensure that it is non-abrasive so that it does not scrape the floor. also create your own cleanser by combining lemon juice or vinegar with hot water. After applying it to the floor, rub it dry using a clean towel.

3.3.3.2 Grout care

Dingy-looking flooring are the result of dirty grout. Grout is porous and absorbs dirt, oil, and other things readily. Using a professionally prepared grout cleaner, spray the grout. Then, using a mild bleach solution, clean the area. When utilising these sorts of items, it's a good idea to wear gloves. Allow the cleaner to rest for 10 minutes for deep stains. Scrub the grout with a toothbrush or other tiny scrub brush, then mop the floor, rinse well, and wipe dry.

To remove tough grout stains, use a paste of baking soda and water. Apply it on the stain, let it lie overnight, then clean with a nylon brush the next day. Avoid using a metal brush since it will harm the tile. Allow the grout to cure before applying a silicone-based grout sealant to prevent future stains and grime.

3.3.3.3 clean stain

To remove stains from coffee, tea, or juice, wash the tile surface with hot water and soap, then blot with hydrogen peroxide. For grease stains, use club soda and water or a commercial floor cleaner to clean. Soak a cloth in diluted bleach and place it on top of the stain to remove ink stains. Leave the cloth on the stain until it disappears. When finished, carefully rinse.

CHAPTER 4

CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The conclusion of this report is about installation of ceramic tiles, that located at Surau Cheneras Jaya, 27200, Kuala Lipis, Pahang Darul Makmur for community Taman Cheneras Jaya. The objective of this report is to identify the installation of ceramic tiles and equipment and tools used for installation of ceramic tiles. From this report, that can find out the installation of ceramic tiles is beginning from setting out , excavate the soil, install reinforcement and pad foundation, install concrete pilller, concrete slab and installation of ceramic.Other than that, this report describe the equipment and tools used for installation of ceramic tiles like manual cut cutter, mortar mixer, rubber bucket , tile trowel, rubber grouts and tiles spacer.Beside that, in this report also describe the maintenance ceramic tiles by routine maintenance, grout care and clean stain. Trough the installation of ceramic tiles on the site, it can be seen more clearly how the process of installation of ceramic tiles and what the equipment and tools should used for the installation of ceramic tiles and also maintenance ceramic tiles.

4.2 recommendation

For the future report, is recommend to do research about the installation of porcelain tiles. Installation porcelain tiles is many people use it now. There are many advantage of using porcelain tiles such as cost can be saved and the density of porcelain tile makes it more durable while being less subject to wear and tear.

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