



**DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
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FLOOR FINISHES: INSTALLATION OF TILE FLOORING

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(PERAK)**

FEBRUARY 2022

It is recommended that the report of this practical training provided

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Entitled

FLOOR FINISHES: INSTALLATION OF TILE FLOORING

be accepted in partial fulfillment of requirement has for obtaining 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 stated herein, prepared during a practical training session that I underwent at Arena Bina 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 : January 2022

ACKNOWLEDGEMENT

First, I would like to forward my humble gratitude to Allah SWT for the blessing and giving health and strength to continue my practical training and complete my report within the time given.

Furthermore, I would like to express deep gratitude and thanks to my practical training employer, Mohd Saini bin Jamian for always give support and guidance while doing practical training in site. He always cooperates and give assistance based on appropriate scope of work.

I am extremely grateful to my academic supervisor lecturer, TS Normila Ahmad for giving me opportunity to do some research and providing guidance throughout this research. Furthermore, I would like to thank Dr. Hafizah binti Mohd Latif who also provide a specific guidance about format and always follow the progress of my report.

Last but not least, I would like to express appreciate to my family for giving me good place and time while completing report. Lastly, I am grateful to my friend to those helping me by giving opinion.

ABSTRACT

Floor finishes are very important structure elements in a building. Floor finishes plays a role in making the floor of the building in a durable and easy to maintain condition in cleanliness for the comfortable building at the same time making the building more attractive and cooler. This report will discuss about floor finishes work for tile flooring of the building. The report conducted for the construction of one storey rental house at Jalan Rizab Zazuli, Jeram, Selangor. The objective of the report is to figure out the construction of tile flooring and the way of how-to full fill it. It also to analyse the tools and machineries in method of tile flooring and determine the time that have spent for overall construction. This report also shows the problem and solution in floor finishes construction that could fulfil the building criteria tile flooring

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CHAPTER 1: INTRODUCTION

A floor finish in general term referred to permanent floor covering. It's supposed to maintain and extend the life of the floor while also giving it a nice look, attractive and making it slip-resistant. Polymer emulsions, film formers, modifiers, preservatives, and water are the five basic categories of floor finish ingredients. Some of the twenty-five chemicals in floor finish evaporate after drying, while others remain. "Volatile" components evaporate, while "nonvolatile" components remain on the floor. Ingredients are used to improve properties such as hardness, gloss, clarity, scuff resistance, slip resistance, water resistance, and detergency in floor finishes. (Meraj, 2014). Furthermore, the flooring usually covers another, structural layer of flooring, floor covering is a more exact term than finish floor. The top layer of flooring is the finish floor, often known as floor covering. In another way, floor finishes it's the layer you walk on at home or any buildings, and it's usually highly decorative compared to the layers beneath it. (Wallender, 2021).

Floor finishes theoretically consist of seven types of floor finishes that are usually used in construction building and important to commercial, residential and industrial such as tile flooring, wooden flooring, marble flooring, vinyl flooring, granite flooring, glass flooring, stone flooring, and quartzite flooring.(Prabhat chhirolya, 2016). Tile flooring was manufactured from variety of materials like Clay, stone, metal, terrazzo, and quartz each style of tile flooring has its own distinguishing features.(Calcamuggio, 2011). Moreover, Tiles are a popular flooring option because they provide a variety of advantages, particularly for homeowners seeking an attractive, long-lasting, and cost-effective look.(Bipat, 2019). In addition, Wooden flooring refers to any product made of wood that is intended for use as flooring, either structurally or attractively. Because of its environmental profile, durability, and restorability, wood is a popular choice for flooring. It is widely accessible in a variety of styles, colours, cuts, and varieties, and thus brings benefits to many house owners.(Amal Sridar, 2016).

Furthermore, Marble flooring is the most widely utilised natural stone in the construction industry, especially for marble floors. It is a member of the limestone family, and it is generated when limestone is subjected to severe heat and pressure, causing the stone to metamorphose and it can give result of impurities such as iron oxide, mica, graphite, and quartz, it comes in a variety of gorgeous colours.(Admin, 2017). Moreover, Vinyl flooring is a synthetic flooring that is long-lasting, inexpensive, and simple to install. Vinyl is sometimes with other flooring choices such as linoleum and laminate. Kitchens, baths, playrooms and basements all benefit from vinyl flooring. (Handyman, 2019). In addition, stone flooring is the ideal, long-lasting solution for covering concrete floors in basements, garages, and patios, even in flood-prone areas. Limestones, quartzites tone, slatestone, and cobblestone are the most common natural stone kinds.(Prabhat chhirolya, 2016)

In addition, Tile flooring was so popular in any construction around the world that have many advantages. One of the advantages was cost effective because ceramic tile is an economical option. The cost of installing tiles is very comparable to the cost of installing other types of flooring. Of course, this depends on the other types of flooring used; for example, certain hardwoods are quite expensive. The durability of the tile pays for itself. When a tile is treated properly, it is easier to care for and clean in the long run.(Cook, 2017) Furthermore, tiles flooring was saving the environment because tiles are made of a variety of materials, each with its own set of eco-friendly properties. Clay, which is a renewable resource which can be used to make ceramic and porcelain tiles. On the other hand, quarried stone can be an outstanding environmentally friendly alternative because new technology have allowed quarries to be reclaimed much faster, preventing and decreasing environmental harm.(Londono, 2019) Lastly, Tiles are fantastic for keeping house cooler. On a sweltering day, there's nothing like the freshness of a tile floor to keep buildings cool. Carpets are more heat resistant than tiles, which keep home cool. Those who live in hot climates, such as the Southwest, may discover that tiles are an excellent method to save money on their air conditioning expenditures.(Cook, 2017). There are many types of floor finishes in theoretically. However, the aim of this study is to discover the installation of tile flooring at single-storey house

1.1 Objectives

1. To determine the method of installation tiles flooring.
2. To identify the time of installation tiles flooring
3. To identify the problem and solution in floor finishes construction

1.2 Scope of study

The scope of study has been carried out at Jalan Rizab Zazuli located at Kampung Bukit Hijau, Mukim Jeram, Daerah Kuala Selangor, Selangor. The focus of this study is to discover on how the installation of tile floor process. Moreover, the study will describe more about advantages and disadvantages floor finishes in the construction, including all material using in construction, as well as machineries and tools for floor finishes construction. Furthermore, the problem while doing floor finishes and the solution has been written in this study. But the study was not focused on quantity of workers or labours and the costs. Moreover, to achieve the study, there are three methods need to be carried out which are by observation and interview. In conclusion, all the explanation about the project has been explained as below.

1.3 Method of study

1. Observation

The construction and installation method of floor finishes was observed at site with the average time approximately 3-4 hours for method of installation tile flooring. Overall, took 2weeks for flooring process. All the observation included every single works carried out by labours. All the data from observation have been collected and recorded by writing points on daily book and application notes on smartphone model iPhone 7 plus. Furthermore, the pictures and video about the process were taken by smartphone model iPhone 7 plus.

2. Interviews

The interview was one of the methods used to collect the construction data by doing semi-structured interview. Usually, an unstructured question will be asked to the workers on the site especially about the focused work which was installation of floor finishes. For example, the method of installation of ceramic tiles. By having unstructured interview were conducted with the labours when working at site. All the data were recorded by writing on application notes on smartphone model iPhone 7 plus. The interview has been conducted from time to time at work.

3. Document review.

The document review that has been used to collect data in construction is company profile, progress report and pictures taken. Company profile have been used as reference about company in detail and the past project. Furthermore, the pictures taken by others also as a reference in progress project.

CHAPTER 2: COMPANY BACKGROUND

Arena Bina was established in 15TH of March 2000. Arena Bina was a construction company. Manager of this company is Mohd Saini bin Jamian. Arena Bina Headquarters located at Jalan Anggerik, Kampung Bukit Kuching, Jeram, Selangor. The scope or main course of Arena Bina is related to construction works with government departments projects, private progress, and individuals' project. Arena Bina has received many projects under tender Department of Irrigation and Drainage, Lembaga Zakat Selangor and Malaysian Public Works Department. In addition, Arena Bina is active in providing transportation services such as lorries and heavy machinery. In the beginning, the project done by Arena Bina was more on houses and building renovations. But now, Arena Bina has made a lot of private houses, government projects like houses, roads, and drainage systems. The project area built by Arena Bina was built in the rapids area but now the project reaches the districts of Kuala Selangor and Ijok. The farthest project in Bentong, Pahang.

2.1 Completed Projects

Arena Bina has monitored many government projects that have been completed under main contractor as shown in Table 1

Table 1: Completed projects

| Project's Name | Contractor's Grade | Price (RM) | Duration | Started | Finished |
|--|---------------------------|-------------------|-----------------|----------------|-----------------|
| Work on maintenance community hall Kampung Pecah Batu Rantai Panjang, Ijok, Kuala Selangor, Selangor | Grade 1 | 29,155.00 | 4weeks | 16/7/2018 | 13/8/2018 |
| Work on maintenance drainage system at Jalan Kunci Air (STJ) at Kampung Sri Tiram Jaya, Kawasan Saliran Blok 1, Tanjung Karang, Kuala Selangor. | Grade 1 | 13,200.00 | 4weeks | 25/9/2018 | 23/10/2018 |

| | | | | | |
|--|---------|------------|---------|-----------|------------|
| Work to construct complete a new building of 2-bedroom houses under Projek Pembangunan Rakyat Termiskin (PPRT) at Jalan Rizab Tomi, Jeram, Selangor | Grade 1 | 80,000.00 | 4weeks | 6/1/2020 | 1/2/2020 |
| Renovating and repair work buildings and related work at Rumah Tunas Harapan Tengku Ampuan Rahimah, Kuala Selangor | Grade 2 | 470,000.00 | 10weeks | 24/7/2020 | 3/10/2020 |
| Work on maintenance and upgrading buildings and related work at Sekolah Agama Menengah Tinggi Kuala Kubu, Jalan Pahang, Kuala Kubu Bharu, Selangor. | Grade 2 | 270,000.00 | 8weeks | 17/9/2020 | 20/11/2020 |

2.2 Ongoing Projects

Arena Bina has monitoring ongoing government projects and individual projects under main contractor as shown in Table 2.

Table 2: Ongoing project

| Project's Name | Contractor's Grade | Price (RM) | Duration | Started | Estimated to finish |
|--|---------------------------|-------------------|-----------------|----------------|----------------------------|
| Works on maintenance of the Bestari Jaya Health Clinic at Pekan Batang Berjantai, Selangor | Grade 1 | 20,000.00 | 4weeks | 4/9/2021 | 2/10/2021 |
| Works on maintenance of the Bestari Jaya Health Clinic at Pekan Batang Berjantai, Selangor | Grade 1 | 20,000.00 | 4weeks | 4/9/2021 | 2/10/2021 |
| Work to construct two-door rental house on own land at Jalan Rizab Zazuli, Jeram, Selangor. | Grade 1 | 120,000.00 | 8weeks | 2/8/2021 | 6/10/2021 |

2.3 Organisation Chart

The organisation of chat in Arena Bina, there are one department who are responsible for overall construction. Headquarters and site were in same department. The manager is responsible in managing all stuff in construction and building services. Moreover, he responsible was to plan machinery used for construction buildings or maintenance works. Furthermore, he planned and carried out drawing building, maintenance, and quantity survey. In addition, he took all the responsible in planning the government project and tender works.

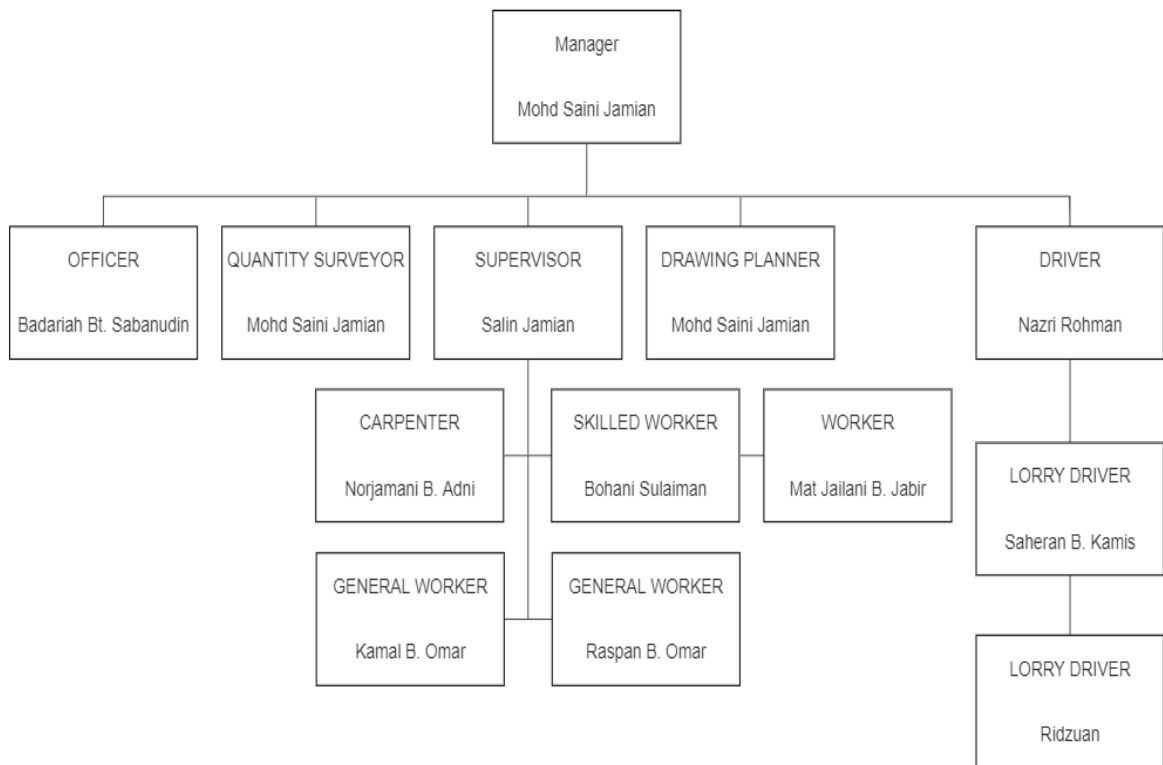


Figure 1: Arena Bina organizational chart

CHAPTER 3

The case study is about floor finishes (installation of ceramic tiles). The project has started and fully finished on. The cost of the construction approximately one hundred and twenty thousand Ringgit Malaysia (RM 120,000). Currently the project was completed. Moreover, the study will be explained not only based on installation floor finishes but including the machinery and tools have been used in construction, the time that have been carry out and the problem and solution while install tiles on construction. The site location was located at the Lorong Rizab Zazuli, Kampung Bukit Hijau, Selangor.

The project construction located at, Lorong Rizah Zazuli, Kampung Bukit Hijau, Jeram, Selangor. This construction area is beside a main road of Lorong Rizab Zazuli and the road to Puncak Alam. The area was surrounded by oil palm trees. There are several housing buildings and food stall close to this construction area. There are also existing a bungalow construction in about 100 meters from the construction.

The activities that have been carried out on the site is installation floor finishes. This work needs to carry out by skilled worker to get a perfect flat and stable floor. There are also several unskilled workers that help to mix mortar and bring the ceramic tiles to the skilled worker. The machineries and tools that involved in this construction are manual tile cutter, tile trowel, electric mixer, rubber hammer, laser level, bucket, sponge, strings and pin and measurement tape.

Moreover, time progress in construction is very important. By referring the area of building, the building has two houses. Each house has 9500mm length and width was 7600mm. There were many rooms in this building 6 bedrooms which two of it was main bedroom. Furthermore, there have 2 living area, 2 kitchens, 2 bathroom and 2 toilets. Toilet and bathroom are located near the laundry area. The tile flooring work started after the rendering floor finishes. Therefore, this process recorded started from the first process of tile flooring work until the finishing work.

Last but not least, the problems of installation floor finishes installation were identified during the process in construction. The solution in dealing with this problem has also been taken after identifying the problem of installing floor finishes.

3.1 Determine the method of installation tiles flooring.

RENDERING FLOOR



Figure 2 : The workers mixed cement mortar



Figure 3 : Cement mortar lifted by worker using wheelbarrow

The cement mortar mixed by some workers using concrete mixer based on ratio of 1:3 cement sand. The other workers lifted the cement mortar into the building using wheelbarrow.



Figure 4 : Rendering process

Cement mortar has been poured on the floor and the mortar has been levelled using a shovel. After that, the mortar was levelled using a wooden cement trowel with a height of 3 inches than the previous floor carried out by skilled workers. This floor rendering process is made for the installation of ceramic tiles.

INSTALLATION OF CERAMIC TILES



Figure 5 : Plan out floor and determine ceramic tiles

The floor has been planned out by referring the length and width the space. The ceramic tiles that have been selected and purchased from hardware have been checked to ensure that the size of the tiles is appropriate based on the length and width of each space in the house. Rough ceramic tiles have been selected for toilets and bathrooms for the purpose of preventing falls. Ceramic tiles that have been purchased have two different sizes, namely 300mm x 300mm and 600mm x 300mm and have five designs in total.



Figure 6 : The tiles soaked in water tank before installation



Figure 7 : Tiles dried after soaking

All tiles to be installed have been soaked in water in a water tank for 2 hours before the tile installation work. This is intended because the tile will absorb water from the cement, making the gap between the ceramic tile and the cement part invalid, and the bond not firm, resulting in empty drums, tiles, and other issues.



Figure 8 : The worker installed string and pins

The line for installation ceramic tiles were marked using string which were pinned from corner-to-corner room in each tile installation space. Strings were installed to each room with pins tapped using a hammer. The strings intended as a sign for workers to attach tiles neatly and orderly.



Figure 9 : Cement tile are mixed by using electric mixer.

For the mixing bonding cement tile, 1 litre of water, Latex Adhesive Chemical, Cement tile gum and cement were poured into bucket and mixed by electric mixer.



Figure 10 : Cement tile levelled on the floor.



Figure 11 : Ceramic tiles placed on cement tile.



Figure 12 :Ceramic tiles knocked by using rubber hammer



Figure 13 : Identify the tile level.

Cement tile that has been ready to be mixed will be pulled and levelled on the floor by a skilled worker using a tile trowel until it is shaped like a wave. After that, the tiles had laid on a cement tile that has been levelled according to the pinned rope. Ceramic tiles that have been glued are tapped with a rubber hammer so that the tiles and cement stick and flat. After that, the tile was measured by laser level to ensure the same level and gradient of the tile.



Figure 14 : The mortar removed using scrapper.



Figure 15 : Wiping the mortar

The excess mortar that comes out of the tile crevice after installation removed using a scrapper. The excess mortar removed so that the installed tiles look clean and tidy. Traces of mortar adhering to the tiles are cleaned using a sponge and a rag while the mortar was still not dry.

SKIRTING PROCESS



Figure 16 : Cutting the tiles using manual tile cutter



Figure 17 : The worker placed the cement tile



Figure 18 : Ceramic tile placed on the bottom wall

After finished installing ceramic tiles, skirting installed as protection for walls from dirt and furniture in the house. skirting ceramic tiles that laid in the corner of a wall and floor junction. The wall cleaned and free from dust to avoid obstacles in skirting process. The process started when tiles were cut to a width of 3 inches using a manual tile cutter. After that, cement mortar is placed on the tile using a trowel. The tiles are placed on the wall according to the floor tiles and the level is measured using a water scale.

3.2 To identify the time of installation tiles flooring

The installation of tile flooring in this project in overall takes 1-2 weeks to complete until finishing work. Time to complete all processes according to the set time estimate. While facing the project, there are some obstacles when installing tiles, namely some tile errors and because of the movement control order covid-19. However, the contractor and labour manage to complete the tile flooring installation in estimated time within 2 weeks.

The installation of tile flooring process for the construction One storey two door rental house at Jalan Rizab Zazuli, Kampung Bukit Hijau, Jeram, 45800, Selangor started from 20 September 2021 until 30 September 2021. The time for installation tile flooring observed and recorded picture taken by smartphone model Iphone 7 plus.

20 September 2021 – 21 September 2021

House No.1

Bedroom 1, bedroom 2, and bedroom 3.



Figure 19 : The installation ceramic tiles for bedroom 1, bedroom 2, bedroom 3.



Figure 20 : Bedroom 1



Figure 21 : Bedroom 2

21 September 2021

Bedroom 3 and kitchen.



Figure 22 : The installation ceramic tiles for bedroom 3 and kitchen.



Figure 23 : The kitchen

22 September 2021

Living area



Figure 24 : The installation ceramic tiles for living room



Figure 25 : Skirting living area



Figure 26 : The living area

23 September 2021 – 24 September 2021

House No.2

Bedroom 1, bedroom 2, and bedroom 3.



Figure 27 : The installation ceramic tiles for bedroom 1, bedroom 2, bedroom 3



Figure 28 : Bedroom 1



Figure 29 : Bedroom 2

24 September 2021

Bedroom 3 and kitchen.



Figure 30 : The installation ceramic tiles for bedroom 3 and kitchen.



Figure 31 : Bedroom 3



Figure 32 : The kitchen

25 September 2021

Living area



Figure 33 : The installation ceramic tiles for living room



Figure 34 : The living room

27 September 2021 – 28 September 2021

Bathroom and toilet.



Figure 35 : The installation ceramic tiles for bathroom and toilet



Figure 36 : The bathroom

29 September 2021 – 30 September 2021

Bathroom and toilet.



Figure 37 : The installation ceramic tiles for bathroom and toilet.



Figure 38 : The toilet

3.3 To identify the problems and solution in floor finishes construction

Problem: Non-straight tile level

The quantity of mortar is important in the installation of ceramic tiles. The quantity of mortar that is levelled by the worker before laying the tiles is one of the factors of non-straight tiles. If the quantity of mortar is less than the others, then the level of the tiles with the other tiles will be lower and cause the floor to be uneven. It also happened when the workers do not measure the tiles on string.

Solution: Using laser level on levelling tile

The installation of ceramic tiles level problem can be fixed by using a laser level. The laser is light, and the light will travel in a straight line, making the worker stick the tiles with a straight line. Installation of tiles will be neater and straight because the laser level has four corners of straight lines that are suitable for the installation of ceramic tiles. By using a laser level, it will save time from using strings and pins.

Problem: Tiles fell and broken

The slippery surface of the tiles is a factor in the tiles falling and breaking. Workers who carry large quantities of tiles and weight cause the tiles to slip and fall. Broken tiles will add to the cost of materials and to the detriment of the host.

Solution: wearing some gloves

The way to prevent tiles from falling is to wear gloves when lifting tiles. This is to add grip while holding the tile and prevent it from falling and breaking.

Problem: Error of different sizes and designs

Tile installation should be the same size and design so that the floor looks neat and tidy. Different sizes are a factor in the problem of installation tiles, there are some tiles that are errors and do not follow the specified size specifications. During installation there are some tiles that are large or small and there are also different designs than they should be. This happened due to an error during manufacturing at the factory.

Solution: Exchange from hardware

The solution due to size and design errors of ceramic tiles is to replace it with the correct tile at hardware. The site supervisor will replace with another in hardware according to the original tile and recheck with another tiles.

CHAPTER 4

CONCLUSION

The floor finishes are important to buildings because it create building more aesthetic and change a look in building as well as dirt resistance. The installation of floor finishes was started from rendering floor, plan out the floor, mix the mortar, pin, and line,

The process took around 1-2 weeks starting from 20 September 2021 - 30 September 2021 until finishing work. The installation floor finishes were finish in the estimated time even with of movement control order during the pandemic Covid-19.

The method of installation floor finishes in the construction have always been used in many buildings at is similar to the theory. There is nothing was carried out differently during installation floor finishes in this construction. Furthermore, the problem occurred such as non-straight tiles, broken tiles and error in size and design tiles has been solved.

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