



DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

THE CONSTRUCTION OF SUBSTRUCTURES

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(PERAK)

DECEMBER 2019

It is recommended that the report of this practical training provided

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Entitled

CONSTRUCTION OF SUB STRUCTURE

Be accepted in partial fulfillment of the requirement for ~~obtaining~~ obtaining the Diploma In Building.

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references are stated herein, prepared during a practical training session that I underwent at Kelbina Design & Construction for duration of 20 weeks starting from 5 August 2019 and ended on 20 December 2019. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfilment of the requirements for obtaining the Diploma in Building.

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ACKNOWLEDGEMENT

Alhamdulillah, praise to Allah, the Most Merciful, the Most Graceful.

I would like to extend my heartfelt gratitude for the guidance, advice and help during my practical training. They are Tn. Haji Sufizal Bin Mohd Zain the manager, En. Muhammad Faris Bin Ismail project architects, En. Khairul Akmal Bin Ahmad technical assistant and other people, who always help, guide and develop my knowledge and fulfil every question in my mind. They also help me to understand the theory involved in the construction of pad footing. They also taught me about how to calculate rebar in the pad footing. They also responsibly help me to further enhance my ability in understanding the procedures in construction and others. It is an honour for me to be given the opportunity to work along with these amazing people.

I would also like to thank ALL the UiTM lecturers that have taught and nurtured me in becoming a better student and person. I would also like to extend my deepest appreciation to the lecturers who are directly involved during my practical training. To Dr. Kamarul Syahril Bin Haji Kamal Supervising Lecturer, En Muhammad Naim bin Mahyuddin Practical Training Coordinator and Dr. Dzulkarnaen bin Ismail, Programme Coordinator, I value the time, effort, encouragement and ideas that they have contributed towards the successful completion of my training, this report and the valuable knowledge that have been shared over the last few semesters.

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

Thank you so much.

ABSTRACT

Substructure is an under laying or supporting the structure to the superstructure which it is below ground level. This report are briefly described and explain about elements of sub structure and how to construct it for the construction of single terraced and detached house. sub structure will include the ground beam and foundation which is transmit the load to the underneath sub soil. The objective of this report is to learn about the method of construction and installation of sub structure. Through showing the construction of sub structure, this report is also highlights the method for install the elements of sub structure. For complete this report also needed a several method such as interview, observation, internet searching and reference from another sources.

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CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope Study

Substructure is the lower part of building which is will constructed below the ground level. Substructure generally support and transfer the load from superstructure to under laying soil. Sub structure will be direct contact with supporting soil which involving foundation and beam of building. For any construction activity to start piece of land will be needed to start the work which basically at ground level to get a solid base.

Substructure is more complicated and important other than superstructure because substructure is the main supported for any building. Substructure is complicated for design that must consider for soil data, soil pressure, presence and other. This report mainly about the complete installation of sub structure element and method which is foundation and beam. Foundation and beam safely transfer the load from superstructure.

There are few methods to constructed substructure which is first excavated the soil for the foundation work, earthwork support, concreting and bricklaying. All the method of this topic will be fully explain in details through case study afterwards and fully report.

1.2 Objectives

The objectives of this study are:

1. To determine the method of construction.
2. To investigate what is needed to construct of substructure.
3. To investigate function of substructure

1.3 Method of study

The research method of carrying out this study are :

1. Observation – the site is for substructure construction focusing on the method of installation for ground beam and foundation. The observation took about 1 hour while instruction about the substructures construction was given.
2. Interview – for the interview, unstructured interview and semi interview used to get more information and details about substructures construction. First interview the state engineer assistant and project architect about the problem or weakness during construction work and solution to solve the problem.
3. Document reviews – There are several documents that report to refer such as construction drawing, company profile, standard operating procedures and others. These documents obtained during site visit at the time when observation and interview ongoing.
4. Internet – Internet was the foremost of sources that could be obtained by network which users can access all the data and information by clicking and searching to the right network. The common network that used were google and blogs.

CHAPTER 2.0

2.1 Company Background

Kelbina Design & Construction is a company that master in housing, developer and construction. Kelbina Design & Construction also offer plan drawing services, renovation work and build home on your own land. This company just was newly established for one year. The company has partners which is Paksi Mutiara Properties Sdn. Bhd that will be managed the construction work. The company also have own lawyer which is Zany and Partner which is will managing the house buying and selling business.

The company has continuously strengthened their foundation by focusing on quality, productivity, efficiency, innovations and integrity in every field of this operation. The management of the company is committed to fulfil its responsibilities towards the interest of their employee, share partners and public at large by practicing prudent management. The management strongly believe that the strength and success of the company is due to effort and commitment of the talented and dedicated management.

The internal environment of Construction Design & Construction has been created enhance the growth and realise the potential of talented and dedicated employees within and supported by creative, and professional although the company just newly be established. Trust and respect among employees is the part of the team spirit to achieve the goal of the company.

2.2 Company Profile



Figure 1.1 company logo

Company Name : kelbina Design & Construction

Registration No. : 002868310-x

Status : Active

Established Date : 01/08/2018

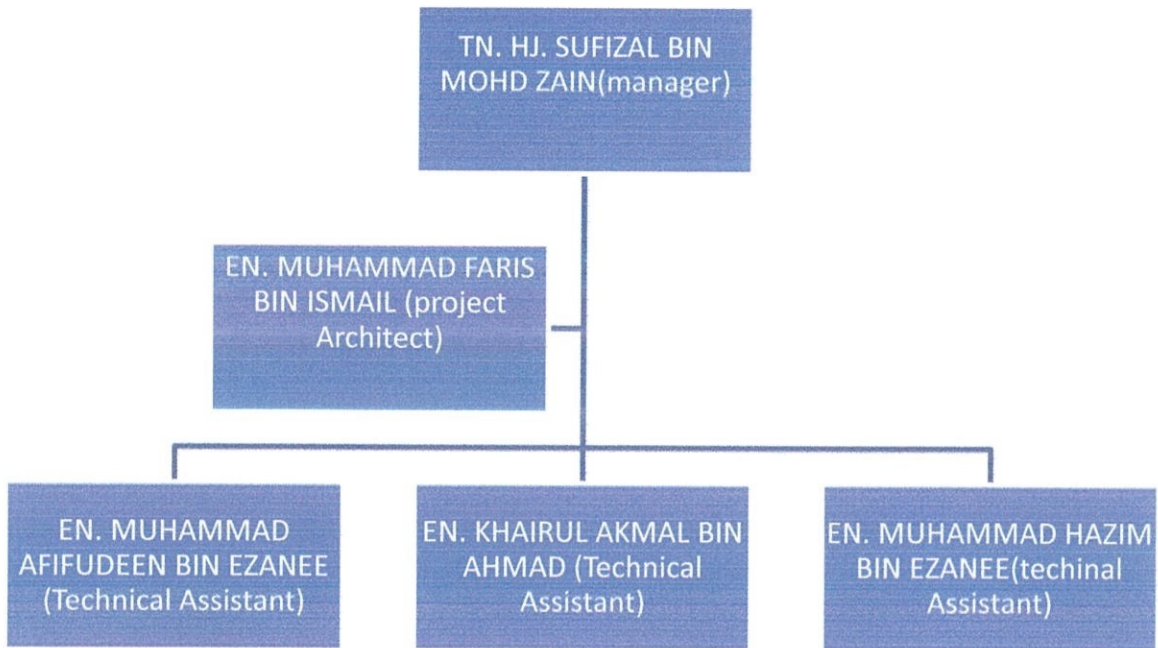
Registered Address : Lot 203, Tingkat 1, Jalan Pengkalan Chepa,
15400 Kota Bharu, Kelantan.

Telephone No. :

Fax No. :

Web site : www.Kelbina Design & Construction

2.3 Company Organization Chart





Sources: Kelbina Design & Construction (2019).

2.4 LIST OF PROJECT

Table 1.1 completed project

2.4.1 Completed project

No.	Projects	Year	Client
1.	<p>Membina Dan Menyiapkan 1Unit Banglo 1 setengah Tingkat, Mulong Ketereh, Kelantan.</p> 	2018	Pn. Azrah Ariffin
2.	<p>Membina Dan Menyiapkan 1 unit Banglo 2 Tingkat, Ipoh, perak.</p> 	2018	En, Zulkifli



3.	Membina Dan Menyiapkan 1 unit Banglo 1 Tingkat, Kemuting, perak.	2019	En. Kamal Hassan
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Table 1.2 projects in progress

2.4.2 Project in progress

No.	Projects	Year	Client
1.	<p>Cadangan Membina 1 Unit Pejabat 2 Tingkat Dan 3 Unit Gudang 1 Tingkat, Panchor, Kelantan.</p>  	2019	Hj. Ismail Bin Abdullah

<p>2.</p>	<p>Membina Dan Menyiapkan 1 unit Banglo 1 Tingkat, Kuchelong, Bachok Kelantan.</p> 	<p>2019</p>	<p>Mahligai Indah Construction</p>
<p>3.</p>	<p>Membina Dan Menyiapkan 22 Unit Rumah Teres 1 Tingkat Dan 2 unit Rumah Berkembar, Telong, Bachok Kelantan.</p> 	<p>2019</p>	<p>Paksi Mutiara Sdn. Bhd</p>

CHAPTER 3.0

3.1 Case Study

KELBINA DESIGN & CONSTRUCTION current project was “Membina Dan Menyiapkan 22 Unit Rumah Teres 1 Tingkat (Jenis Kekal) Di Atas Lot PT 21358- PT 21379 & 2Unit Rumah Berkembar(Jenis Kekal) Di Atas Lot PT 21380 & PT 21381 Mukim Telong Bachok,kelantan Darul Naim. This project was a new project for Kelbina Design & Construction. This is for the people to be able to have their own home with low cost.

KELBINA DESIGN & CONSTRUCTION involved in this project as the main contractor and will be helped by Paksi Mutiara & Properties. The main office KELBINA DESIGN & CONSTRUCTION is located at Lot 203 Tingkat 1, Jalan Pengkalan Chepa, Kota Bharu Kelantan Darul Naim. The client was Puan Noor Hanifah Bt Abd Ghani. Here, Encik Faris Bin Ismail as a project architect and engineer for the construction site which took full responsibility for this project to make sure that this construction project can be done punctually based on the expected completion date which is 4 March 2019.

This project is consists of En. Hj. Sufizal Bin which is the director manager for this project. Then it is divided into two assistant which being directed by En. En. Muhammad Afifudeen Bin Ezanee and En. Muhd Khairul Bin Ahmad. This project has being surveyed by Encik Hazim Bin Ezanee as a quantity surveyor



1.2 Location of Company

3.2 Objective 1

The objective of our report is to investigate the method and procedures the construction of substructures. I have been through all the data the procedures to gain a fresh data just for the specified report site that has been given to me. Like any other construction method, these constructions also include the site clearance. The purpose of doing site clearance is to clear all the details at the site construction because it will make all the work easier and save a lot of time.

Then, continued with the excavated soil for foundation which base the depth of the site that needed to be built within the minimum base depth of the site is 1500mm. If the contractor is only digging the ground within 1000mm and this may be cause the cracking on the house. The next step is Install reinforcement bar. The reinforcement bar will be cut and bent and then arranged according to the plan drawing. The next is install formwork for foundation. The formwork will be placed according to dimensions and size of the foundation which be provided in design detail. Formwork generally is made by plywood and woods. After that the concrete will be poured into formwork. Before poured concrete, reinforcement bar must have been in good condition to avoid from problems in another time.

After the finished construct foundation, the foundation holes will be drained to construct the ground beam. The first step is install reinforcement bar for ground beam. Reinforcement detail such as size, number of longitudinal reinforcement, number of spacing of stirrups and length are required in structural drawings shall be checked after reinforcement placement is finished to avoid from problem in another time. After that, install the formwork. Before formwork installation, formwork will be sweep by oil to avoid formwork from cling to the concrete and made easy to remove. At the end of process, the concrete will be poured into the formwork of ground beam as the complete of construction of substructure

3.3 plant And Machineries

Table 1.3 Plant and machineries

NO	Plant And Machineries	Function
1	<p data-bbox="193 396 325 427">Bulldozer</p>  A yellow bulldozer is shown in profile, pushing a large pile of dark brown soil. The bulldozer has a large front blade and is equipped with heavy-duty tracks. The background shows a construction site with a dirt embankment.	<p data-bbox="970 396 1327 600">Use to push large quantities of soil, sand, rubble or other thing material that during construction work</p>
2	<p data-bbox="193 1167 336 1198">Excavators</p>  A yellow excavator is shown from a side profile, standing on a dirt surface. It has a long hydraulic arm with a bucket at the end. The excavator is marked with the 'CAT' logo. The background shows a construction site with a dirt embankment and some distant structures.	<p data-bbox="970 1167 1321 1312">Use to digging of trenches, holes that obtain during construction work</p>

4

Concrete mixer



Device that homogeneously combines cement, aggregates and water in form concrete. Usually uses a revolving drum to mix the components

5

Compactor



Used to reduce the size of waste material or soil through compaction.

6

Crane truck



Use for lifting heavy things and transporting them to other places. Equipped with hoist rope, wire ropes and shaves.

3.4 Method of Construction

Method of construction for sub structure construction

1. Site clearance

Site clearance is an important part of many construction and demolition projects. Its involve removing machinery and hazardous substances from site as well as levelling and preparing land for any planned construction or landscaping. Proper site clearance is essential for safety of all workers and anyone else that may be present onsite



Figure 1.3 site clearance



Figure 1.4 Excavator clear the tree and branches

2. Excavation for foundation

Before excavation process begin, the site will be setting out which is using pegs and string to mark the area which will be excavated. Foundation is important component of the construction process. The base depth of the site that needed to be built within the minimum base depth of the site is 1500mm. If the contractor is only digging the ground within 1000mm and this may be cause the cracking on the house. Besides that, make sure there is no stagnant water in the hole before the concrete work.



Figure 1.5 Foundation holes



Figure 1.6 Excavations for foundation

3. Install the reinforcement bar for foundation

After finishing formwork installation, reinforcement bar work is carried out on the project site which involves cutting and bending of high-strength steel bars. The types of reinforcement bar that be used in this work is Y12 where the reinforcement bar is cut and bent and then arranged according to the plan drawing provided before carried inserted into the meld that has been placed in the corrosion hole.



Figure 1.7 Reinforcement bar for foundation

6. Install reinforcement bar for ground beam

Once the construction of foundation is done, reinforcement placement begins directly side one side of formwork is placed. Reinforcement bar work is carried out on the project site which involves cutting and bending of high-strength steel bars. The types of reinforcement bar that be used in this work is Y12. Reinforcement detail such as size, number of longitudinal reinforcement, number of spacing of stirrups and length are required in structural drawings. Lap length, hooks, spacers and reinforcement cover shall be checked after reinforcement placement is finished to avoid from problem in another time



Figure 1.10 Reinforcement bar placement

7. Place formwork for ground beam

After the reinforcement bar is installing, the formwork will be place according the size that has be design based on drawing detail. Formwork is term used for structures that are used to support forms or molds for poured concrete that usually be made from plywood and woods. Before formwork installation, formwork will be sweep by oil to avoid formwork from cling to the concrete and made easy to remove.



Figure 1.11 Formwork installation

8. Pour concrete for ground beam

Concrete work will be start after the inspection be done to make sure the formwork and reinforcement bar be in good condition. Concrete mix on site will be used for this work. The concrete mix is very important because the ration of water to mortar will helps to determine the strength and workability of the concrete. Once the concrete has been poured and spread into place, concrete will be compact and remove any air that may be present within in mix.



Figure 1.12 concrete work for ground beam

3.5 problem And Solution

Table 1.4 problem and solution

NO	Problems	Solutions
1.	<p>The material</p> <ul style="list-style-type: none"> • The materials that been ordered being delayed 	<ul style="list-style-type: none"> • The engineer on site and assistant manager need to have good contact with the supplier so that all material that has been ordered will be at site on the right time according the schedule. Late arrival of material can lead to delayed of work that can coast more time and money to complete the work
2.	<p>The drawing</p> <ul style="list-style-type: none"> • Have a structure problems • Design problems 	<ul style="list-style-type: none"> • The architect needs to make sure that the plans that have been drawn need to being in immaculate shape without any flaw so that there will be no problem.
4.	<p>The weather</p> <ul style="list-style-type: none"> • Rainy day • The ready mix become harden and the process need to be stopped 	<ul style="list-style-type: none"> • The main contractor needs to have an early plan so that they can avoid weather from disturbing their work. This is very important because the client can charge the contractor for delay of the project because the contractor should know about the upcoming weather when planning the construction work.
5.	<p>Communication</p> <ul style="list-style-type: none"> • Misunderstanding with each other in the project 	<ul style="list-style-type: none"> • The main contractor needs to order the whole team in a wonderful manner so that the whole team will get the right info so they can work together with the same goal in mind.

4.0 CONCLUSION

As a conclusion, this project showed the construction of sub structures for project of 22 units single terraced house and 2 unit single detached house at Bachok, Kelantan including the type of foundation that has be used, methods, problem, solutions and the machine that has be used in this project. The progress of the project has been investigated at the site project and the interview with the site supervisor being successfully. The progress of discovered the whole project from the started until finished being success. The types of the foundation and the methods that has be used is not the new which the foundation and methods is similar to that of theory which is the method is using a few heavy machineries and general for the construction of sub structure.

This project were start with excavate the surrounding area and ended with inspection. Before started this construction project, there has a problem such as misunderstanding between the workers but thankfully that problem can be solve quickly and didn't affect the construction duration time.

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APPENDIX B



KELBINA DESIGN & CONSTRUCTION

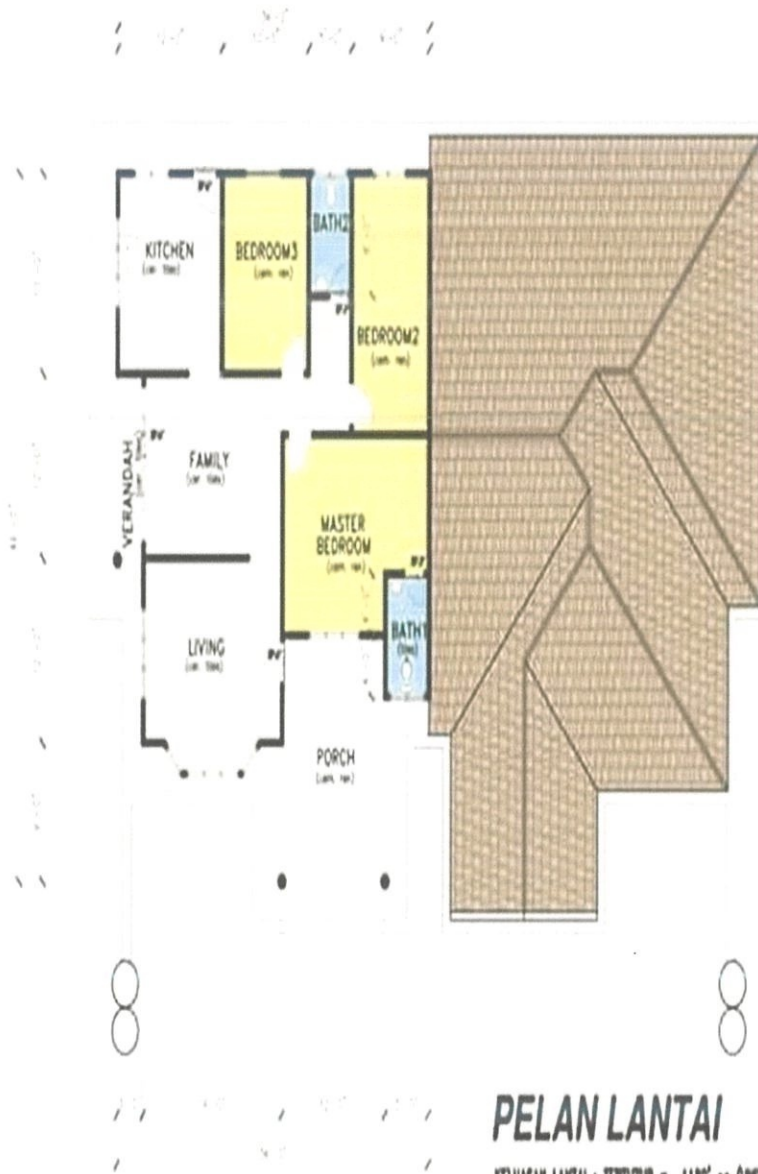
Lot 203, Tingkat 1, Jalan Pengkalan Chepa 15400 Kota Bharu Kelantan Darul Naim

Call us:

kelbinadesign@gmail.com

kelbina design & construction

APPENDIX C



PELAN LANTAI

KELUASAH LANTAI : TERTUTUP = 1180' sq./UNIT
 TERBUKA = 228' sq./UNIT
 1408' sq./UNIT



KELBINA DESIGN & CONSTRUCTION

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