DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

THE CONSTRUCTION OF PAD FOUNDATION

Prepared by:

MUHAMMAD ZULHADZHIM BIN MD SHARIF

2016458604

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

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It is recommended that the report of this practical training provided

by

Muhammad Zulhadzhim Bin Md Sharif

2016458604

Entitled

The Construction of Pad Foundations

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

Report Supervisor	:	Dr. Mohd Rofdzi Bin Abdullah
Practical Training Coordinator	:	En. Muhammad Naim Bin Mahyuddin.
Programme Coordinator	:	Dr. Dzulkarnaen Bin Ismail.

DEPARTMENT OF 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 Arah Semangat Sdn Bhd, ASSB for duration of 14 weeks starting from 03 September 2018 and ended on 07 December 2018. It is submitted as one of the prerequisite requirements of DBG307 and accepted as a partial fulfilment of the requirements for obtaining the Diploma in Building.

Name	:	Muhammad Zulhadzhim Bin Md Sharif
UiTM ID No	:	2016458604
Date	:	18 October 2018

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ABSTRACT

The starting structure for almost all superstructures is sub-structure. The foundation is a basic and initial structure to support superstructure. The construction of foundation should need to consider a few things before choose the foundations. The element they should consider is the factors contributed to project choose foundations. The examples of the element are the factors contribute projects to use the foundations, the method on site use during works and the problems that will face and solution for the overcome. Arah Semangat Sdn Bhd one of the foundations they use pad foundation as their one of foundation on site. The wrong decision of choose the types of foundations use, it will be more problems and troubles will come out to the work of construction at site.

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1.	JKR :	Jabatan Kerja Raya	9
2.	CIDB :	Construction Industry Development Broad	9
3.	PKK :	Pusat Khidmat Kontraktor	9
4.	ISO :	International Standard Organisation	9
5.	KKM :	Kementerian Kewangan Malaysia	9
6.	CLAB :	Construction Labour Exchange Centre Berhad	10
7.	QMS :	Quality Management System	10

CHAPTER 1.0

INTRODUCTION

1.1 Introduction and Scope of Study

The approach adopted in this report is based on the managing system and handling the structure of construction that exist at this site, Mutiara Residence. The report implemented at site of Lot 1633 Kampung Paya Kemunting, Jitra, Kedah. This site is generally around by residential area and other facilities such as hospitals Jitra, food court, mosque Syarifah Fatimah, Sekolah Menengah Kebangsaan Paya Kemunting, and other residential. This report will focus on the pad foundations construction work only. The scope of this research will cover the following areas, the duration of time needed for construction of pad foundation. The machinery and equipment needed for the construction of pad foundations and the flow of works to constructs the pad foundations at Mutiara Residence houses.

The method construction of foundations is the flow or steps all about the beginning work for structure. Generally, everything will start with basic of it, same to the construction of structure or building. Foundation of a structure is always constructed below the ground level so as to increase the lateral stability of the structure. It includes the portion of the structure below the ground level and is built. Because, it want to provide a firm level and surface for transmitting the load of the structure on a large area of the soil lying underneath.(Ackmans R.G;1980).

The foundations define as a structure that safely to sustain and transmit to the ground, which it rests the combined dead, imposed and winds load. Because, for not to cause any settlement or other movement which would impair the stability or cause damage to any part of the building. (Roy Chudley and Roger Greeno;2010). Foundations are important because it provide for all load carrying structure based on variety reason such as for the stability of any structure. The stronger is the foundation, more stable is the structure. Moreover, the proper design and construction of foundation can provide a proper surface for the development of the substructure in a proper level and over a firm bed and specially designed foundation helps in avoiding the lateral movements of the supporting loads and structure to the project at site. It also important part that need more attention. (Adams,A.;2014).

There are various types of foundations such as shallow and deep foundation. Every kinds of foundation, has their own usability for construction works. Shallow foundations spreads into three kinds of foundations such as pad foundations, strip foundations, raft foundations and the examples of deep foundations is pile foundations. Shallow foundation is transfer the load to the earth very near to the surface, rather than to a subsurface layer or range of depths as does as deep foundations. Generally foundations need to be taken below 5000 deep are cheaper when designed and constructed as piled foundations.(Roy Chudley and Roger Greeno;2014).

The design principles are one of the main objectives for foundation. There are a few basic design procedures which as assessment of the site conditions in the context of the site, choosing the foundations based on soil conditions, type structure, structure loadings and construction problems. (Roy Chudley and Roger Greeno;2010). The basic sizes for foundations depend on the load being transmitted and bearing capacity of subsoil under proposed foundations. This is because the size of a foundation is basically depends on the load being transmitted and the bearing capacity of subsoil under proposed foundations. Bearing capacities for different types of subsoil may be obtained from tables such as those in BS 8004: Code of practice for foundations. (Roy Chudley and Roger Greeno;2010).

This report will deal closely about pad foundations for Mutiara Residence and construction works under main contractors, Arah Semangat Sdn.Bhd. The pad foundations is foundations to piers of brick, masonry and reinforced concrete and steel columns is often in the form of square or rectangular pad of concrete. The area of this type of foundation depends on the loads on the foundations and the bearing and shear strength of the subsoil and its thickness on the strength of the foundation material. The simplest form of a pad foundations consist of a block of mass concrete. (Crosby Lockwood Staples;1973). The advantage of pad foundation is economic due to control of foundation size. Besides, it also shallow form foundations that just need little excavation and the shape can be designed to accommodate tight sites.

Pad foundations consist of reinforcement concrete or steel column, reinforcement base to footing and blinding. Moreover, it also designed to span in two directions therefore main bars are placed in the bottom both ways. The size and type of reinforcement concrete and the grade concrete often use is based on the load and function. There are variety types of foundations on construction works, but, this report is focus more to the method construction of pad foundations.

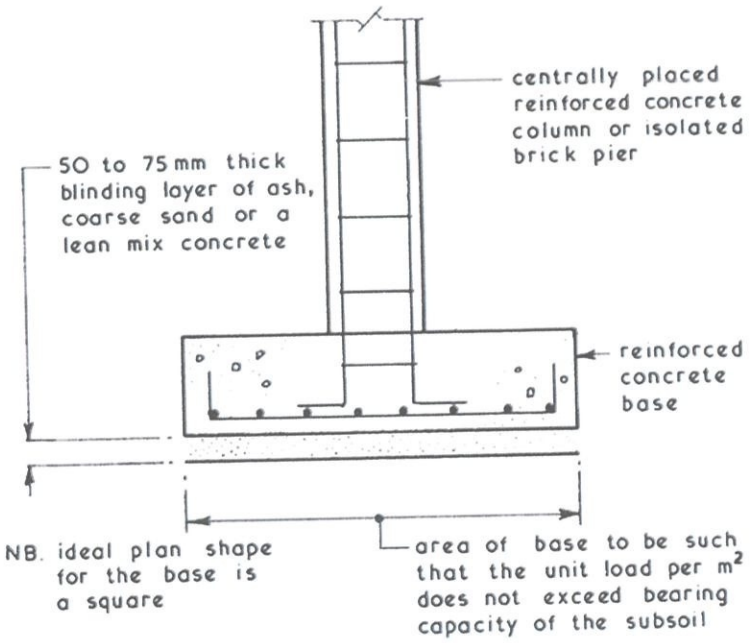

Figure 1.1 The illustration of Pad Foundation

Source: www.google.com/search?biw=

1.2 Objective

These objectives of this study are:

1. To investigate and study the factors that contribute for contractor, Arah Semangat choose pad foundations as their foundations for houses.

2. To find out the methods construction of pad foundations at the site for residential houses of Mutiara Residence.

3. To identify the problems occurred and the overcome to solve problem during construction.

1.3 Method of Study

In order to achieve the study objectives, a systematic process was organized to conduct the study properly and systematically. The detail method of study is divided into several basic steps. There are several methods of study that used to complete this study and report. This method usually will be used to help for collecting useful information about pad foundations. Thus, the methods of study that use for this study to get information are such as observation, interviews, document reviews and discussion. The initial literature review had done in order to obtain an overview of the concept of this topic, method construction of pad foundation by refer some books with article from internet.

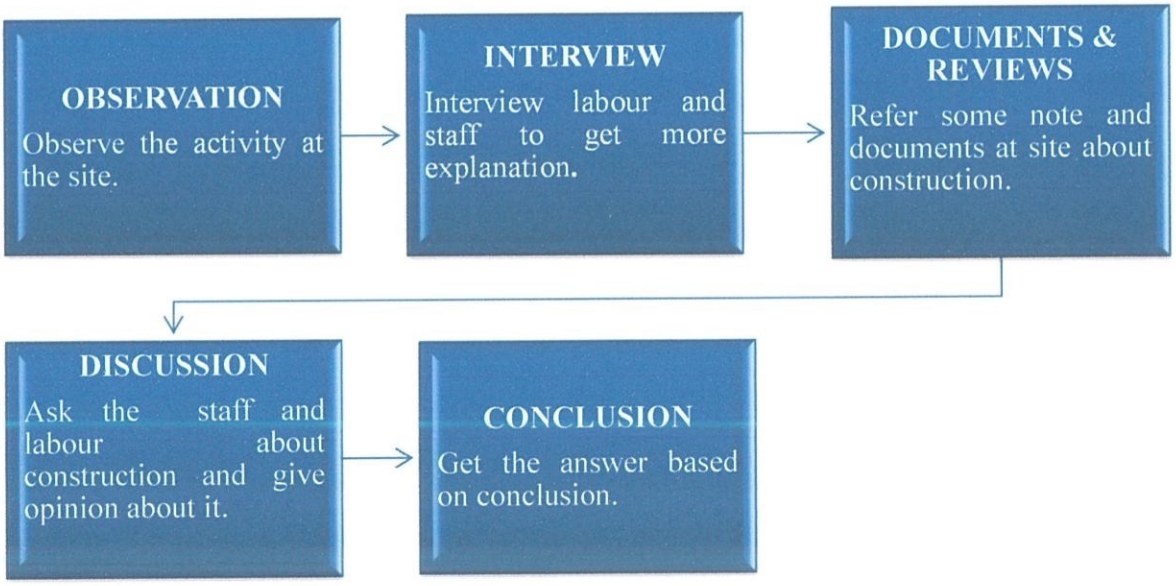

Chart 1.3: The method of study flow chart.

Source: www.google.com/search

1.3.1 Observation

In this method, main method use is observes the process of construction pad foundations. During internship period try makes sure that not left out even a single thing about constructions of pad foundations. The observation is going recorded in various ways such as written notes and also by taking pictures of works going on. Taking the information and detail of work which from initial to final works besides written notes that understands and see the work.

1.3.2 Interview

Do an interview to make sure that clarify something that not sure about pad foundation. In this report both type of interviews do, such as unstructured-interviews and semi-structured. For unstructured-interviews ask question on site during do observations to understand more about method construction of pad foundations by interviews concreting labours, carpenters, common labours and site structure supervisor. During this interview, the place is at the site office or site construction for pad foundation.

Sometimes, semi-structured interviews going on to get knowledge about pad foundations. For example when outside the site, prepare some question about pad foundations beforehand to ask the labour or site structure supervisor on the next day. Through this, many questions will more follow-up question cropped by during this interview.

1.3.3 Documents and Reviews

To make the better understanding about the project, go to the site office where can see some document about the project of construction pad foundations. For example, the construction drawing plan, details about the project and so on. All construction work must follow the drawing specifications, because when something happen contractor or other will refer the drawing to know and checked more detail. This will surely help to writing this study and report with enough information.

1.3.4 Discussion

To make sure that this research methods progress is in the right path, do a discussion that take place at site office Arah Semangat, Jitra, Kedah. The discussions are often with site structure supervisor and other supervisor. This discussion always takes time about a certain period and almost every week in duration internship. The discussion is being done purposing to compile all the data obtained and then divide with arrange all the data collect. Besides, discussions are also with friends and lecturer about construction of pad foundations.

All of these methods of study that have been list above have surely can give the upper hand to completing this assignment right before the deadline. The aim of all the methods used only to collect and get the detail and information of construction works for pad foundations. After the data collection stage, analyses all the collected data, information, ideas, opinions and comments. The analysis will be conducted by reviewing legal references about the works. The final stage of the study process mainly involved the writing up and presenting the research findings. I will review the whole process with the intention to identify whether the research objectives have been achieves. Conclusion will be made after based on the findings during the stage of analysis.

CHAPTER 2.0

COMPANY BACKGROUND

2.0 Company Background

2.1 Introduction of Company

Arah Semangat Sdn Bhd was incorporated on 28th January 2002 as one of a construction company. The management of this company located at the Alor Setar, state of Kedah Darul Aman. Furthermore, it is a 100% wholly owned by Bumiputera. This is because this company has registered with (PKK) Pusat Perkhidmatan Kontraktor and (CIDB) Construction Industry Development Board Malaysia. Besides, this company also has registered with Finance Ministry of Malaysia (KKM) too and Arah Semangat Sdn Bhd has obtained its Quality Management System, ISO 9001 on 19 May 2007.This company also has registered with CIDB Malaysia, which is under Grade G7 and also has a Certificate of Contractor Service Centre Class A (Sijil Pusat Khidmat Kontraktor Kelas A).

Besides, the company has been also carrying out the variety projects of many scopes for work since it's established. In addition, this business of company is more focuses on infrastructure, structure and management work. The example of scope works are such as building construction, housing, road construction, building maintenance and project management. This company also achieves many kinds of awards from government and other authority. The achievements that Arah Semangat Sdn.Bhd got are, Anugerah Kualiti Kontraktor Cemerlang 2009 and got the title of Kontraktor Bumiputera Berprestasi Tinggi from (JKR) Jabatan Kerja Raya Malaysia.

Furthermore, the services that Arah Semangat Sdn Bhd provided since an established construction company which is specializes in part of design and build. This company implemented effective management system in our company and comply with QMS ISO 9001 standards requirements. Moreover, Arah Semangat Sdn Bhd had completed variety project categories of civil engineering and building constructions structure and infrastructure, with standard timely and quality delivery in accordance with clients' requirements.

Moreover, this company also has cooperation with (CLAB) Construction Labour Exchange Centre Berhad, in management of labour and worker for work at site. The aim of cooperate with CLAB is for smooth the management of worker and safety for labour and worker to do their work under this company. Based on CLAB, all of the workers that under CLAB have fulfill all the requirements of authority for work at Malaysia as foreigner. Problems of intake labours will be more systematically and safety without any big problems when cooperate with CLAB and it also one of legal agent under government.

Every organization should have their own mission and vision of their business, same to Arah Semangat Sdn Bhd. The vision for their business is a construction specialist catalyzing property development through excellent administration and management. The missions of this company are to provide high quality finished construction and property development. Furthermore, this company also wants to fulfill customers' requirements and desire and to increase resources and optimum returns to the shareholders. Moreover, they also want to provide condusive working environment and dynamic workforce and to support environment and local culture towards harmony.

2.2 Company Profile

2.2.1 Company Information

Figure 2.2.1 Company Logo

Company Name	Arah Semangat Sdn Bhd
Registered Number	570126-P
Address	No. 7, Villa Seri Tunku Anak Bukit, Lebuhraya Darul Aman, 06550 Alor Setar, Kedah.
Telephone Number	
Email	arah_semangat@yahoo.com
Date of Incorporation	28th January 2002
PKK Status	Contractor Class 'A' (Bumiputera)
CIDB Status	G7 (B, CE)
ISO Status	ISO 9001 : 2008 EN ISO 9001:2008 BS EN ISO 9001 : 2008 MS ISO 9001 : 2008
Business Scope	Building, civil and structural engineering works.

Table 2.2.1 Company Information

Source: Arah Semangat Sdn.Bhd (Company Profile).

2.2.2 Registration of Company

CIDB	Grade G7, Category B, & CE
CLAB	CLAB004586
PKK	012005810-KD105854
KKM	Kementerian Kewangan Malaysia (357-02080958)
ISO	International StandarD Organisatons (9001)
QMS	Quality Management System

Table 2.2.2 Registration of Company

Source: Arah Semangat Sdn.Bhd (Company Profile).

2.3 Organization Office Chart

2.3.1 Management Team Chart

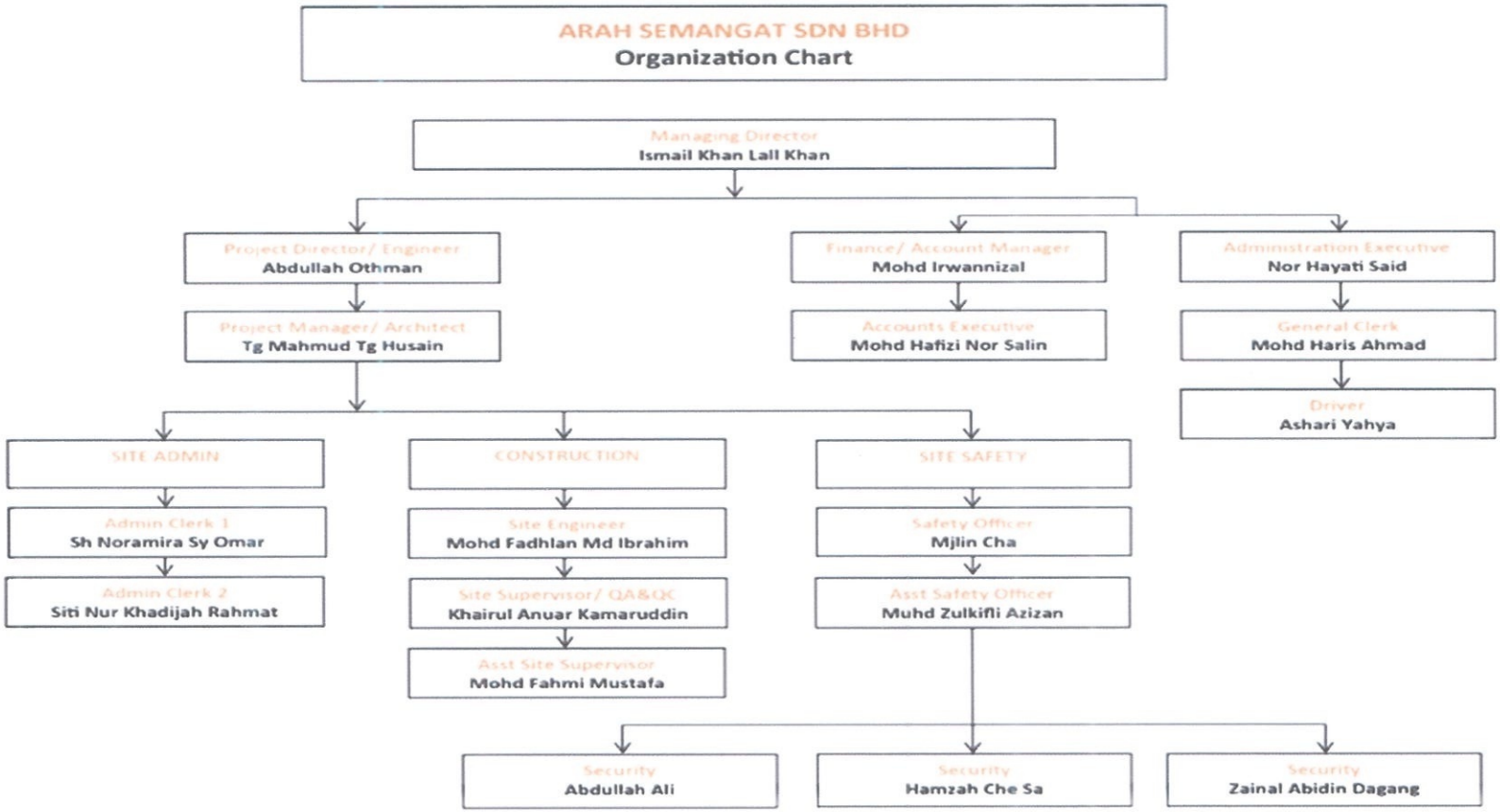

Figure 2.3.1: The Management Team Chart

Source: Arah Semangat Sdn Bhd (Company Profile)

2.3.2 Site Organization Chart

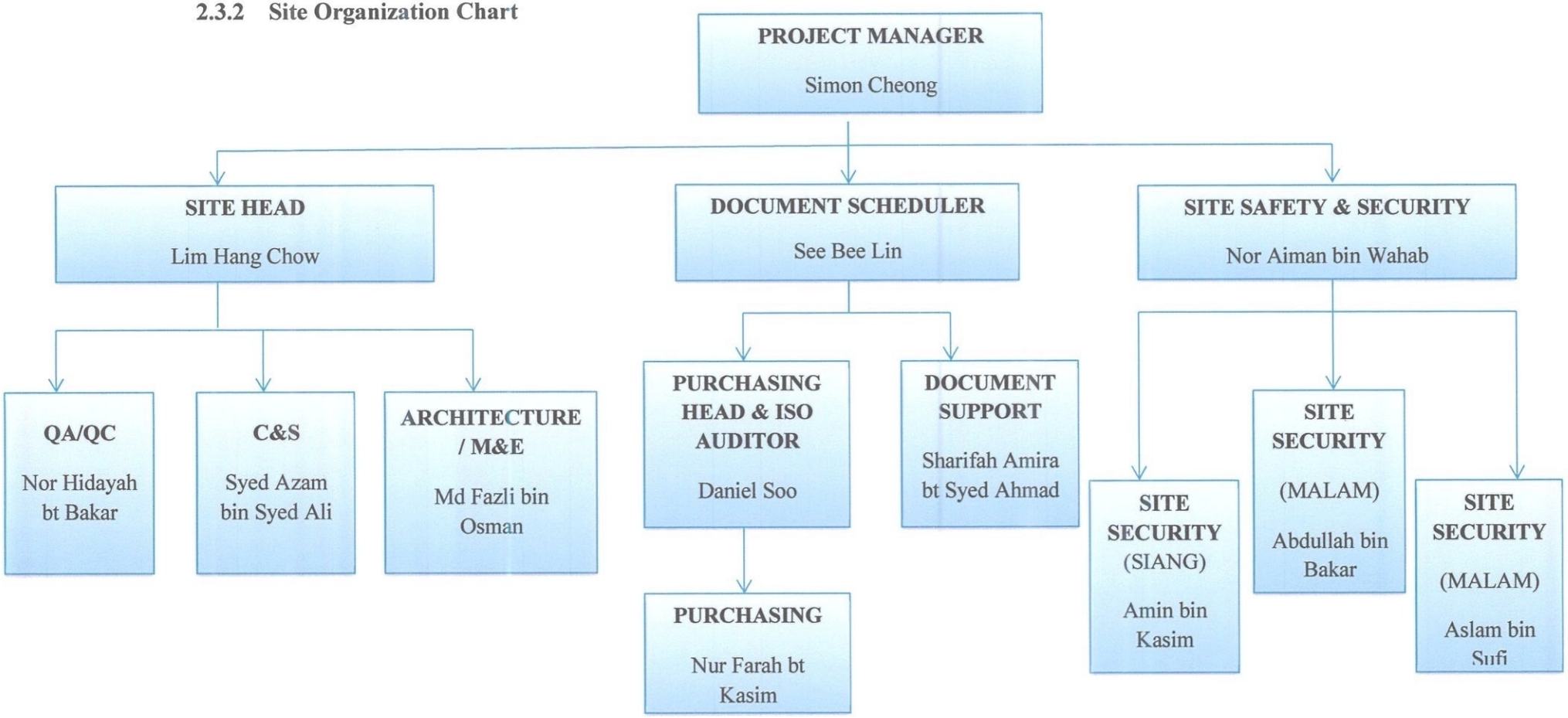

Figure 2.3.2 Site Organization Chart

Source: Arah Semangat Sdn Bhd (Company Profile)

2.4 List of Project

2.4.1 Completed Projects

Project Title	Category	Gross Contract Value (RM)	Client
1. Cadangan membina dan menyiapkan sebuah masjid, dewan serbaguna, tadika dan kemudahan-kemudahan lain, di atas sebahagian Lot 5008, Bandar Kuala Ketil, Daerah Baling, Kedah.	Building	5,133,309.26	Tan Sri Paduka Dato' Rahmat Bin Abu Bakar
2. Cadangan mengubah suai kerja banglo di atas Lot 256, Kelab Golf Cinta Sayang, Sungai Petani, Daerah Kuala Muda, Kedah.	Building	179,184.50	Tuan Haji Ismail Khan Bin Lall Khan
3. 130 Units of Mixed Residential and Commercial at Darulaman Perdana, Mukim Sungai Petani Daerah Kuala Muda, Kedah	Building	34,199,915.00	Mk Mutiara Sdn Bhd

Project Title	Category	Gross Contract Value (RM)	Client
4. Cadangan membina dan menyiapkan sebuah masjid, dewan serbaguna, tadika dan kemudahan-kemudahan lain, di atas sebahagian Lot 5008, Bandar Kuala Ketil, Daerah Baling, Kedah.	Building	5,133,309.26	Tan Sri Paduka Dato' Rahmat Bin Abu Bakar
5. Cadangan mengubah suai kerja banglo di atas Lot 256, Kelab Golf Cinta Sayang, Sungai Petani, Daerah Kuala Muda, Kedah.	Building	179,184.50	Tuan Haji Ismail Khan Bin Lall Khan
6. 130 Units of Mixed Residential and Commercial at Darulaman Perdana, Mukim Sungai Petani Daerah Kuala Muda, Kedah	Building	34,199,915.00	Mk Mutiara Sdn Bhd

Project Title	Category	Gross Contract Value (RM)	Client
7. Cadangan membina dan menyiapkan sebuah masjid, dewan serbaguna, tadika dan kemudahan-kemudahan lain, di atas sebahagian Lot 5008, Bandar Kuala Ketil, Daerah Baling, Kedah.	Building	5,133,309.26	Tan Sri Paduka Dato' Rahmat Bin Abu Bakar
8. Cadangan mengubah suai kerja banglo di atas Lot 256, Kelab Golf Cinta Sayang, Sungai Petani, Daerah Kuala Muda, Kedah.	Building	179,184.50	Tuan Haji Ismail Khan Bin Lall Khan
9. 130 Units of Mixed Residential and Commercial at Darulaman Perdana, Mukim Sungai Petani Daerah Kuala Muda, Kedah	Building	34,199,915.00	Mk Mutiara Sdn Bhd

10. 1 Unit of Single Storey Office Building at Mukim Ulu Melaka, Langkawi, Kedah	Building	1,889,411.28	Mk Mutiara Sdn Bhd
11. 89 Units of Mixed Residential at Mukim Sungai Petani, Daerah Kuala Muda, Kedah	Residential Building	190,000.00	Mk Mutiara Sdn Bhd
12. 18 Units of Bungalows Lakehome 3 (Phase III) at Bandar Darulaman, Daerah Kubang Pasu, Kedah Darul Aman	Residential Building	14,529,912.58	Mk Mutiara Sdn Bhd
13. Cadangan Membina Dan Menyiapkan Sebuah Surau Dan Kerja-Kerja Lain Yang Berkaitan Di Atas Sebahagian Tapak Masjid, Plot No.952, Taman Insan Fasa 2, Mergong, Daerah Kota Setar, Kedah Darul Aman.	Building	812,490.00	Tuan Haji Ismail Khan Bin Lall Khan

Table 2.4.1 The Completed Project

Source: Arah Semangat Sdn Bhd (Company Profile)

2.4.2 Project in Progress

Project Title	Gross Contract Value (RM)	Client
1. Construction for 32 unit double storey semi-d and 66 unit of terrace double storey at lot 60123, Bandar Jitra, Daerah Kubang Pasu, Kedah	20,000,000.00	Mk Mutiara Sdn Bhd
2. Menara azan Masjid Riyatul Islam, Jalan Dato Kumbar, Alor Setar.	50,000.00	Tan Sri Paduka Dato' Rahmat Bin Abu Bakar

Table 2.4.2 The Ongoing Projects

Source: The Arah Semangat Sdn.Bhd (Company Profile).

CHAPTER 3.0

THE CONSTRUCTION OF PAD FOUNDATION

3.1 Introduction of Project

The project that Arah Semangat Sdn Bhd going on constructs and build are variety kind of houses and building and phase. The first phase construction consists of 36 units of single storey semi-d houses, 131 units of single storey terrace houses, 30 units double storey semi-d houses and 61 units of double storey semi-d houses are almost completely ready give to owner of the houses. The first phase works carry on for right now only recheck for defect and repair before get the occupancy eligibility from authority of government.

Furthermore, the report will more focus on second phase construction which are consist of 32 units double storey semi-d and 66 units double storey terrace houses. The original contract target schedule percentage completion as of 05 of December 2018 and the actual percentage completion as of 05 of December 2018 are achieve, because the target about 15 percent and the progress work get the target. The forecast completion date according to the latest progress as of second phase around 30 of December 2019, but the contract date of completion for this phase is on 31 of March 2020, next year. The contract date of commencement is 01 December 2018. For our information, the original sum for this phase around RM 21,335,243.00.

3.1.1 Case Study Location:

Figure 3.1.1: The satellite image of the case study location

Source: Google Maps (2017).

3.1.2 The site plan residential of Mutiara Residence

This is site plan residential of Mutiara Residence for Phase 1 Consists of four types of houses in this phase. First phase consist of 36 units semi-detached single storey houses,30 units of double storey semi-detached houses, 131 units of single storey terrace house and 61 units of double storey terrace house.

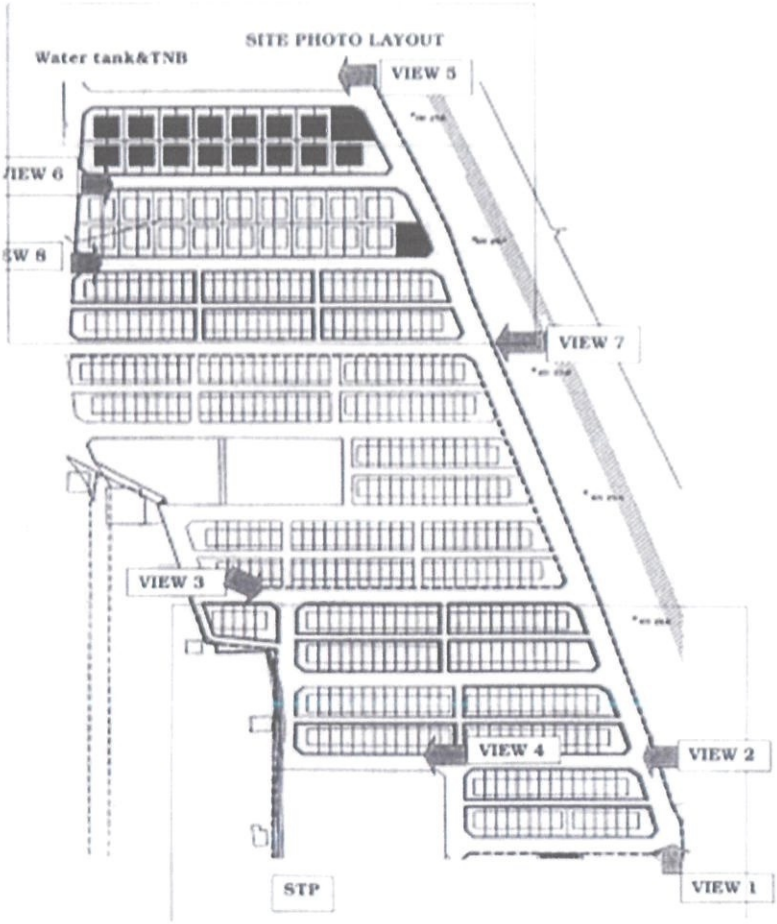

Figure 3.1.2 The site plan residential of Mutiara Residence
Source: Arah Semangat Sdn.Bhd (Company Profile).

3.2 Case Study

All works for construction of the building consist of architecture and structure part. Both of this will depends on each other to completely the building. The flow of works construction in in this site starts with surveying works then structural works and architecture works on site.

The surveying works begins with setting out location for construction. After that, they will mark all the part for construction and especially for foundations works. After that, the leveling works running on to get the suitable depth for the ground. After get the correct and suitable marking and begin to start excavation. This survey play as starting the works at site if the survey correct and good the construction will be smooth.

The structure works for two-storey houses begin from construct the foundations, then ground beam slab continue with ground slab. Before the ground slab start concrete, the rocks and stone put in the space for ground slab then after completely settle fill it will put on termite poison to avoid the breeding of termite. After that the ground floor column will follow and first floor beam with first floor slab will construct after the column completely concrete. When the first floor column completely build, the roof bea will follow and lastly stiffener column.

After the structure works settle construct, the architecture work will enter to take part. Architecture works start with marking the opening for window, door and the space for bricks. After the bricklayer completely install bricks, the conduit and piping work for electrical and sanitary equipment take part. After that will continue with plaster for structure and the trusses with roof will enter then follow by installing frame of opening and finishes for wall going on likes panting works. Moreover, the installation of tiles, door and window will come after the painting work.

This study and report will more focus on the method construction of pad foundation only. The site for Mutiara Residence is using the pad foundations as their foundations for houses. There are some of my objectives that being indicator during this study to get more detail about the method construction of pad foundations on next page, such as:

- The Soil Conditions at the site of Mutiara Residence.
- The Surrounding Area of Building and Structure at the site.
- The Structure Design of the Project Construction at Mutiara Residence.

3.2.1 Factors Contribute Contractors Choose Pad Foundations

3.2.1.1 Introduction

Every decision we do must have the reason and opinion based our observation. This is same to contractors, Arah Semangat Sdn Bhd choose the pad foundations to be foundations for the construction works. Every foundation has different types and functions to the building and construction. Before the contractors choose the foundations, they must study and investigate all the manipulated variables and responding variables about the building and surrounding area.

Furthermore, they must study and investigate properly the variables to decide and get the best answer for foundations the need to choose. This is because wrong decision and selection of foundations it will cause much loss for company construction, Arah Semangat Sdn Bhd. The loss can be loss in scope of work for time construction work, cost, number of worker consists of and others. The foundations play as one of source for profit or loss for the company.

Besides, the types of foundations are important to avoid problems and troubles for surrounding area and company also. This is because different foundation has different method construction of it, so the method must suitable for surrounding area. The problem for company faces if wrong foundations install and choose is the future defect and safety of superstructure will be problems. There are a few factors that contribute the contractors choose pad foundations.

3.2.1.2 The Soil Conditions at the site of Mutiara Residence

Based on my observation and study, the contractor decided to choose the best type of foundations based on safety, costing, time taken and work facilities. In this case, the initial soils conditions at the construction site are mostly peats soil which planting with palm oil plantation. After the plantation want to be site construction, the site must do site clearance after a few steps in investigation. The condition and types of soils also change because the ground of site construction overlays by red dirt clay soil. The conclusion is the soil for constructions are the combination from peats and red dirt clay soil. Pad foundations are suitable for most subsoil except loose sand and loose gravels. (R.Chudley & R.Greeno;2010).

The characteristics of a soil that affect its behavior as a foundation are compressibility, cohesion of particles, internal friction and permeability. It is convenient to compare the characteristics and behavior of clean sand, which is a coarse grained non-cohesive soil, with clay which is a fined grained cohesive soil, as a foundation to buildings. Compressibility is under load sand only slightly compressed due to expulsion of water and some of the arrangement of the particles. Cohesion of particles is negligible cohesion between the particles of sand and in consequence it is not plastic. Internal friction is considerable friction between the coarse particles of sand which strongly resists displacement or rearrangement. Permeability is when water can pass rapidly through the pores of soil the soil is said to be permeable.(Crossby Lockwoods Taples;2010).

3.2.1.3 The Surrounding Area of Building and Structure at the site.

The selection of the building foundation also affects by the condition of the neighborhood and surrounding area. Besides, main contractor, Arah Semangat Sdn Bhd also can choose the best foundation by taking the measurement of the foundation that has been used by other building in surrounding area. For in this case, the construction site is being held on in a place that has many and nearby facilities and residential area. This site is being surrounded mostly by the villages and residential area, for our information, the average of type residential area around this usually single and double storey house types. Thus, due to this factor, the contractor is choose to use the usual foundations and method for this site as it will reduce to bring any harm and problems to the surrounding area. The best answer and solutions for this reasons is pad foundations as foundations in this site.

The surrounding area of the site almost covers by residential for house. Examples defect of residential is Taman Setia Jaya, mosque and other building that consist of their friends. The surrounding area must be taken serious to reduce and decrease the problems with neighborhoods during construction. The methods uses for this construction must suitable with surrounding area to avoid problems and troubles. Because in construction industry, there are few choice have to use based on uses and suitability of it. Furthermore, the types of structure on this project just low rise building only that really suit with pad foundations as the foundations.

3.2.1.4 The Structure Design of the Project Construction at Mutiara Residence.

According to the plan and drawing of this site construction project, the main contractor, Arah Semangat stated that several types and design houses such as single and double storey for terrace house and semi-d houses. The area and loads can be support by pad foundations. Besides, concrete to pad foundations which consist of cement, sand and gravels it also support the strength by reinforcement concrete. This is to make sure that it has adequate strength for supporting purposes because the soil is mostly normal soils and suitable for pad foundations. For example, they do not need to build reservoir plant or anything to backup and support their works at construction area. In this case, they will almost use the necessary and important works for stability and strength of the structure.

Based on the discussion and calculation from management have choose the pad foundations after study for the loads need to be support by foundations. Moreover the load not huge that need a special foundations to support the load that distribute to the underground.

3.2.1.5 The Project Time Frame of Construction under contractors.

The target time to complete all the building and houses are as the indicator for the flow of works for the project. The faster the work completely done with full of safety and standard procedures, the more profit they can achieve. There are variety factors and reasons to faster the movement of construction works, one of them the election of foundations. The foundation is one of the base structures, so if the base or foundations can completely install it will cut the duration needed to for construction. If the work for the construction completely in early than actual time, other works can start and continue, it will reduce many costs such as machinery, labours and materials.

The selection of foundations can help the contractors to save and cut cost with expenditure besides can get the scope of procedure properly. Based on the load for the buildings the suitable foundation is pad foundations. This also can increase the rate of growth for project because save money and can get profit like always.

3.2.2 The Method Construction of Pad Foundation that used.

3.2.2.1 Introduction

The purpose of this method of construction is to explain the proper procedure and methods on how to prepare the construction of pad foundation starting from initial works. The works begins with setting out of site then marking with peg. After that the excavated then install formwork with reinforcement and lastly concrete. The method they use is construction in-situ because they construct all the part in site not pre-cast. They still use the old method construction because all the formwork from woods, the way they marking and running works still old method construction. The method use for construct any structure must be taken seriously.

The method can contribute something good and bad to company of contractors. The good method use for construction can bring advantages, large profit, low cost for construction and save times. If the wrong and unnecessary methods use, it can bring bad feedback to company. The example of bad effect to company are such as loss profit, more time and cost needed, problems with residential surrounding and got more complain about the works.

This site use and choose this method while construct the pad foundations based a few factors. After all discussion and calculation of many things, the finally choose this types of method for construct pad foundations.

3.2.2.2 The Method and Step Construction of Pad foundation

The step of construction pad foundations is begins with site clearance and marking the important parts. Next, excavate the soil and lay a base, lean concrete. Construct formwork for footing and install reinforcement then concrete the footing. After that, construct the formwork for stump.

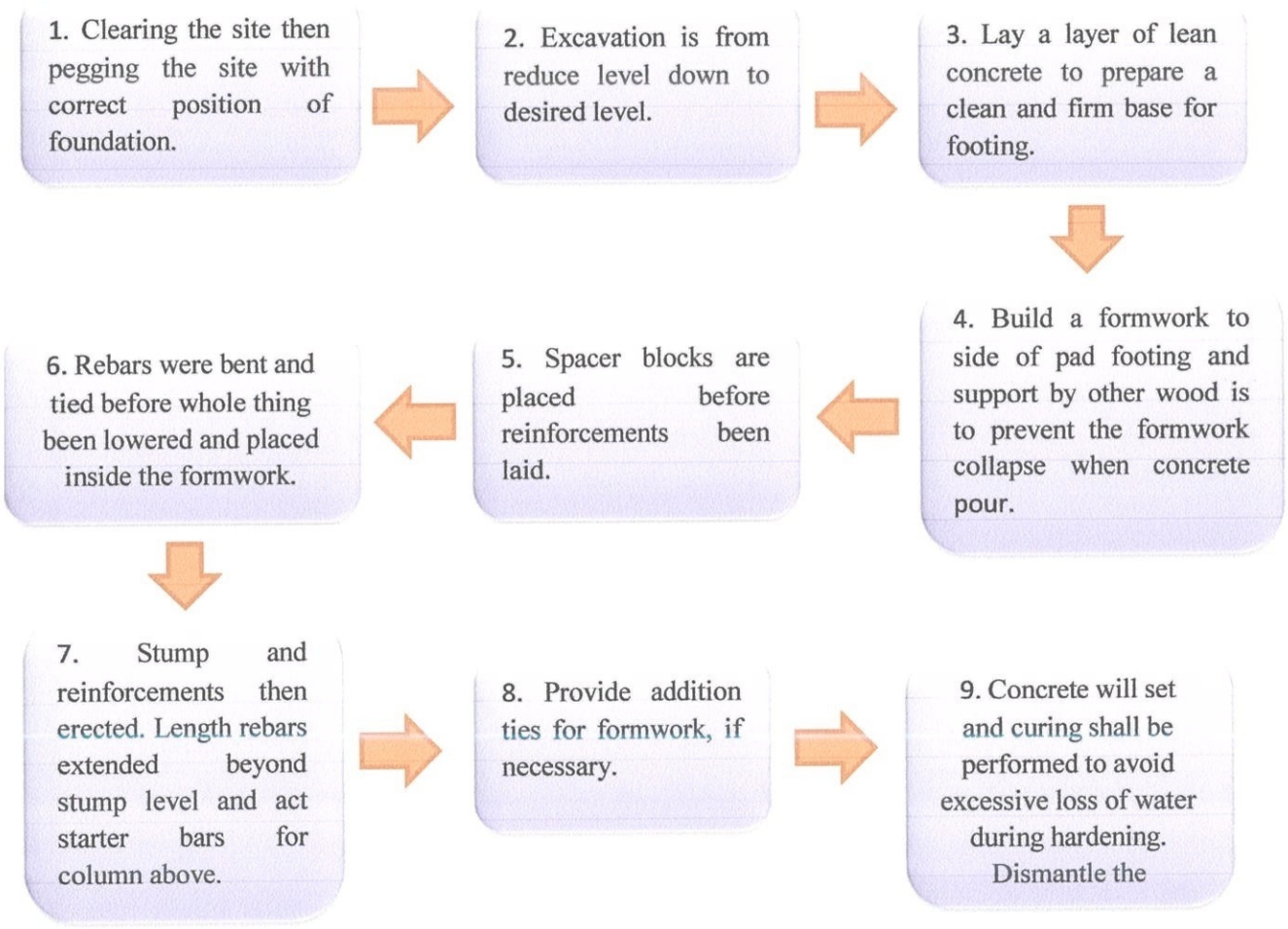

Figure 3.2.2.2: The Method Construction of Pad Foundations Charts

Source: (http://www.concrete.org.uk/fingertips-)

Photo 1.1 The Setting Out Based Drawing

Source: Site of Mutiara Residence

Step1: Setting Out

Setting out of building foundation trenches is the process of laying down the excavation line and centre line on the ground based on the foundation plan. The setting out process is also called as ground tracing that is performed before commencing the excavation process.

Once the design of foundation is complete, a setting out plan or foundation layout is prepared for a suitable scale and the plan is dimensioned accordingly. Procedure and requirements in setting out foundation trenches are explained below. The instruments and equipment use are tripod, theodolite machine, staff, bubbles staff, and measuring tape.

Photo 1.2 The Marking and Pegging Process

Source: Site of Mutiara Residence

Step 2: Marking and pegging

Then, mark the location for excavation. The marking main purpose of marking is for smooth the work during excavation. The marking have two types of marking. The corner of area excavation is marking with peg from steel and the total area with size mark with cement plus sand. Usually the process done by labour and surveyor, mark the point with balance and useless reinforcement concrete. If wrong marking it will wrong excavation and contribute to wrong construction. The marking just for reference operator of backhoe or excavator refer to excavate soil. The tools and equipment use are balance reinforcement concrete, hammer and substance combination of sand and cement.

Photo 1.3 The Excavation of Soil

Source: Site of Mutiara Residence.

Step 3: Excavated the soil

Excavation work done by backhoe or excavator machineries. The depth of excavation is based on drawing provided. The depth of excavated soils for double storey terrace house is 1200 cm based on drawing and the place for drain has drop 300. The depths add for drain to avoid problems in future such as the drain upwards. The depth must be properly due to drawing because it will affect the stability of the structure. The aim to remove top soil is to make sure the footing find or contact with origin soil at the site. The strength among the position of soils is different each other. The size of excavated hole based on the number of foundation that need and position of structure of house.

Photo 1.4 Levelling the Excavated Hole

Source: Site of Mutiara Residence

Step 4: Level the depth of excavated soils

Levelling works do by levelling equipment such as tripod stand, levelling staff, levelling bubbles, staff bubbles, level instruments and measuring tape. The aim of levelling is to recheck the depths of excavated holes. This step or method is about want to check the correct depth of hole excavated by machineries. Besides it also for the checking the area of excavate soil. This method is one of way to check and help the carpenter and others laoburs because to measure the volume $\mathbf{m^3}$ to produce the size of formwork and volume for concreting works. This works is important because the depth the excavated hole not same based on the superstructure position, for example the base for drain need to depth than others base of superstructure.

Photo 1.5 Set up the location of formwork

Source: Site of Mutiara Residence

Step 5: Set up the formwork for pad footing

The position of pad foundation is important because it will contribute to the strength and stability of the superstructure. The distance and position must correctly to the details of drawing. If the position of pad footing wrong, to correct it after concrete is difficult and need more time, cost and it will contribute to waste. In this site, the labour is use a bucket of black oil to check the position of pad parallel to the string that from setting out works. After get the correctly and proper position of the formwork, the formwork nailed to static the pad footing formwork.

Photo 1.6 Laid a Cement Plus Sand as Lean Concrete.

Source: Site of Mutiara Residence

Step 6: Lay a lean concrete as a base

The purpose of lay a lean concrete is to provide the uniform surface to the foundation concrete and prevent the direct contact of foundation concrete from soil in easy to understand is lean concrete is a base for footing. This site is not follow the standard and correct uniform spec of lean concrete. This site use only substance from cement grade 25 and fine aggregate or sand. There are a few reasons that need to use lean concrete. For example, the possibility when footing directly attach on ground is the strength and stability will be reduce. Usually the grade for lean concrete is grade 15. The labour usually put lean concrete a day before the concreting works start.

Photo 1.7 The Installaion of Formwork For Footing

Source: Site of Mutiara Residence

Step 7: Install the formwork for pad footing

Build the formwork to the side of pad footing and supported by other wood to prevent the formwork collapse when the concrete is being pour into it. The area of pad footing formwork is 900mm × 900mm × 200mm. The numbers of labour are usually about three or four labour for install pad footing foundation. This stage the position of pad footing should place in correct and proper position because after this need to install reinforcement concrete. The pad footing of formwork is usually from wood in this site.

Photo 1.8 The Installation of Spacer Block.

Source: Site of Mutiara Residence

Step 8: Install the spacer blocks

First, put the spacer block before reinforcements been laid. This step is purpose to provide sufficient concrete cover for rebars. The function of spacer blocks also to avoid the reinforcement attach to lean concrete. The spacer blocks usually consist of concrete and wire. The function of wire at spacer blocks is to tie with reinforcement concrete. The aim of spacer blocks tie up with reinforcement concrete is to make it more strength to support it. The spacer blocks usually build in a large amount and the size usually approximately same. The amount of spacer blocks in a pad footing is more than one spacer blocks.

Photo 1.9 The installation of reinforcement

Source: Site of Mutiara Residence

Step 9: Install the reinforcements for pad footing

The installation of reinforcement concrete for pad footing and stump same time. The installation for the construction of this is in-situ. Rebars were bent and tied before the whole thing been lowered and placed inside the formworks. The reinforcement is place properly on spacer blocks avoid touching the lean concrete. The example and type of reinforcement use is such as Y20, Y16, Y12 and the links for reinforcement is R10. The different physical appearance of the reinforcement is different for example is the R type reinforcement smooth no line compare to Y type. The reinforcement connect each other by tie with wire use reinforcement hook.

Photo 1.10 The concreting of pad footing

Source: Site of Mutiara Residence

Step 10: Concrete the pad footing

Concreting work will start by concrete pad footing set and curing shall be performed to avoid excessive loss of water during hardening. When the concrete has gained sufficient strength, formwork can be dismantled usually about three days, then continue concrete stump. Usually the grade of concrete use to concrete pad footing is grade 25. The steps to get the volume concrete for each structure use the formula length multiply by breadth multiply by height. The grade of concrete is based on the size and the load to support. In this site, the volume concrete need to concrete pad footing is 1.5 m^3. After the mobile crane release the concrete through bucket, vibrator poker put on stump to avoid void in the concrete.

Photo 1.11 The installation formwork for stump

Source: Site of Mutiara Residence

Step 11: The installation formwork for stump.

The installation formwork for stump approximately like installation formwork for footing. The different between these two type is size and time to install it. The size of stump use is based on the position and the load to support. For example, one of the size stump use in site iss 300 mm × 300 mm × 500 mm. After get the correct position of stump, it nailed by concrete nails. The installation of formwork for stump usually need one labour only. The function of this formwork is to hold the concrete during concreting stump. This formwork also need wood or something to support it, beside to support, it also for smooth work to labour.

Photo 1.12 The concreting of stump.

Source: Site of Mutiara Residence

Step 12: The concreting stump

The concreting of stump formwork is after the removing pad footing formwork and installation stump formwork for pad foundation. The concrete grade for stump same as footing grade 25. The volume of concrete for each stump based on the size. The size of stump usually follow the position and load to support. For example the volume for one type of stump is 1.5 m^3. The formula to calculate the volume of concrete for stump as the calculation to concrete the pad footing, length multiply breadth multiply height. For example, based on one of the stump at this site the volume neeed is 300 mm × 300 mm × 500 mm. After the mobile crane release the concrete through bucket, vibrator poker put on to the stump to uniform the concrete.

Photo 1.13 The dismantle of formwork.

Source: Site of Mutiara Residence

Step 13: Dismantle formwork

Wait until the concrete ready and enough strength, the form work for stump will remove. The duration concrete to dry is usually influenced by weather. In this site, usually the time taken to dry the concrete is approximately in three days. The condition of concrete is really important because the strength will not same as calculation based on engineer calculation. The process of removing formwork is usually use hammer.

3.2.3 The Problems that Contractors of face and the solution taken.

3.2.3.1 Introduction

Concrete in-situ is a method of pad foundation application use at the site. In-situ means on site, it refers to work which is carried out on the construction site itself. Generally, in situ construction techniques tend to be more labour and time intensive, however, they are more flexible in response to changes that may arise on site. During this type in-situ method use, Arah Semangat Sdn Bhd as the main contractor will face some obstacle and problems. The major problems that were obtained from my internship site are uncertain weathers condition, lack and damage the machineries use for construction works.

3.2.3.2 Uncertain Weather at the Site of Construction.

The main problem for the construction pad foundations at the site is the uncertain weathers condition. When the excavation work process begins, that site area is frequently raining. Besides, the concreting works also cannot run properly under raining day based on the scope of procedure Jabatan Kerja Raya (JKR). The reason is the strength and conditions of materials and substances, concrete not same anymore when it combine with water. They cannot predict when it will rain or sunny on that day. The solution and overcome of this problem is that they have to stop the do works especially concreting works process until the rain stop. Besides the welfare of workers must be give attention, because when they get ill the works of construction also can delay.

3.2.3.3 The Damage of Machineries at the site.

Besides, the other problems are and damage of machineries that can be obtained in construction of pad foundation. The examples of machineries use for construction pad foundation are such as backhoe, excavator and vibrator poker. The factor for machine damage is because of the improper way when using and handle it and the improper care of the machine. Examples use the machine without guidance and knowledge properly about the machine. The solution for this problem is they have to wait for the machine to repair, use a new machine to continue the works for construction isolated foundations or use the machine with a proper guidance from professional user.

3.2.3.4 The Lack of Machineries for Construction work.

Furthermore, the lacks of machineries due to many works need the machine, such as backhoe and excavator. When all works want to accelerate their progress work the usage of machineries become higher because many departments want to use it. The effect of lack machineries for construction pad foundations, it will take more time to complete and the work done with not properly due to many request want to use. During the usage of machineries for pad foundations, the works run quickly. The overcome solution for this problems are add news important machines if affordable or do a schedule of work and plan the work properly to give fair usage of machineries.

3.2.4 Recommendation for Arah Semangat Sdn Bhd

The site Mutiara Residence that under management of Arah Semangat Sdn Bhd needs more improvement in construction works. For example, the methods and steps construction of pad foundation need to follow general standard of construction likes use lean concrete grade 15. This site use cement combined with sand as their lean concrete. There are a few reasons that the contractors need to follow the steps and method based on JKR and other authority.

The first one reason is because the strength of structure will be not same as the calculation and planning before the construction works commence. This will cause the other structure disturb with initial works. The strength of the structure is really important because each structure has theirs' own function to building.

The second is the company Arah Semangt Sdn Bhd will loss time and profit for repair and maintenance of the defect. The defect will be decrease if the initial works follow the correct ways. The time and cost that use for repair defect can use for other or new project that can bring more profit to company.

The safety of occupancy for the building might be possibility danger. The big problems come from small problems. If the initial works of construction properly it can give a good and better structure and can give safe condition to occupancy. The buyer of house should get the best condition of house The conclusion is all the problems can be settle if all parts and individual do the correct job and free from corruption.

CHAPTER 4

CONCLUSION

4.0 Conclusion

In the conclusion, pad foundation is an important structure or element in all of structure start with sub-structure to super-structure. Even though the pad foundation usually considered as minor, it plays an important role as it is used to transfer the load of the building to the ground. Any mistakes or faults in the construction of pad foundation may be result in building failure.

Besides, in this study explain the factor contribute contractor choose pad foundation as the foundations for houses. This is because every work and selection of the type foundation must properly for smooth and safety of the work and occupancy. Based on this site, contractor choose pad foundations because the factor of building surrounding area, geographical factors and economy factors.

Next, the method use in this construction is in-situ. Because all of the works are commence at the site. The methods is applied in this work is traditional method because it do not use any new inventions to the work. This site carried out the method construction of pad foundation slightly different compare to theory. Some of the steps the site does not follow. Every works always have problems and usually have solutions. The problems often come from weather and machineries. All the problems almost can be solve due the problems of the works.

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APPENDICES

Appendix A

Appendix B

Appendix C