



**DEPARTMENT OF BUILDING  
UNIVERSITI TEKNOLOGI MARA  
(PERAK)**

**Pre-CAST CONCRETE PILE  
FOR DEEP FOUNDATION AT ARENA SQUARE, GERIK**

**Prepared by:**

**RAUDHATUL JANNAH BINTI SAPANI  
2016618238**

**DEPARTMENT OF BUILDING**

**FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING**

**UNIVERSITI TEKNOLOGI MARA**

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**DECEMBER 2018**

It is recommended that the report of this practical training provided

**By**

**Raudhatul Jannah Binti Sapani**

**2016618238**

**Entitled**

**Pre-cast Concrete Pile**

**For Deep Foundation at Arena Square, Gerik**

Accepted in partial fulfilment of requirement has for obtaining Diploma in Building.

Report Supervisor : Dr. Sallehan Bin Ismail

Practical Training Coordinator : En. Muhammad Naim Bin Mahyuddin

Programme Coordinator : Dr. Dzulkarnaen Bin Ismail

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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 Gemilang Aisy Sdn Bhd for a duration of 14 weeks starting from 3 September 2018 and ended on 7 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 : Raudhatul Jannah Binti Sapani  
UiTM ID No : 2016618238  
Date : 7 December 2018

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Thank you so much.

## **ABSTRACT**

Malaysia is one of the developing countries. Building construction is the process of constructing a building or infrastructure and typically involves mass production of similar items without a designated purchaser, while construction typically takes place on location for a known client. This report was conducted for the building construction and construction of pre-cast concrete pile at Dataran Lawin, Gerik. The prime objective of building construction is to make sure that the performance of the building can be continues to the utmost throughout its design life. Also, to develop for future life. The objectives of report to identify the construction method of pre-cast concrete pile and determine the equipment and machineries that used for construction. The method of study used is interview, case study and literature review will be helped in making this report. To illustrate, the construction industry makes a vital contribution to the competitiveness and prosperity of the economy. A modern and efficient infrastructure is a key driver of productivity, and the construction industry has a major role in delivering the built infrastructure in an innovative and cost-effective way.

## TABLE OF CONTENTS

CONTENTS	PAGE NO
ACKNOWLEDGEMENTS .....	iv
ABSTRACT .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
LIST OF PHOTOS .....	x
LIST OF APPENDIX .....	xi
CHAPTER 1.0 .....	1
PREFACE .....	1
1.1 INTRODUCTION .....	1
1.2 OBJECTIVE .....	3
1.2.1 Aim .....	3
1.2.2 Objectives .....	3
1.3SCOPE OF STUDY .....	4
1.3.1 Primary Data .....	5
1.3.2 Secondary Data .....	5
CHAPTER 2.0 .....	6
COMPANY BACKGROUND .....	6
2.1INTRODUCTION OF COMPANY .....	6
2.1 COMPANY PROFILE .....	7
2.2.1 Owner .....	7
2.2.2 Year of Establishment .....	7
2.2.3 Company Vision .....	7
2.2.4 Company Mission .....	7
2.2.5 Prime Bank .....	8
2.2.6 Official Logo & Symbols .....	8
2.2.7 Overall Gemilang Aisy Sdn. Bhd .....	9
2.3 LIST OF PROJECTS .....	10
2.3.1 Completed Projects .....	10

2.3.2	Project in Progress .....	11
	CASE STUDY.....	12
3.1	INTRODUCTION OF PROJECT .....	12
3.1.1	Introduction of.....	12
3.2.1	Deep Foundation .....	15
3.2.2	Type Piling .....	16
3.2.3	Factor of Selected Pile .....	17
3.3.4	Problem and Solution .....	19
3.3	METHOD STATEMENT .....	43
3.3.1	Construction of Piling at Arena Square, Gerik.....	43
	CHAPTER 4.0 .....	43
	CONCLUSION.....	43
4.1	CONCLUSION .....	43
	REFERENCES .....	45
	References .....	45
	APPENDIX .....	46

## LIST OF TABLES

CONTENTS	PAGE NO
Table 2.1 list of completed project.....	10
Table 2.2 list of project in progress.....	11
Table 3.1 list of consultant .....	13



## LIST OF FIGURES

CONTENTS	PAGE NO
Figure 2.1 Gemilang Aisy Sdn. Bhd. logo and symbols.....	8
Figure 2.2 overall company organization chart.....	9
Figure 3. 1 The perspective view of Open hall Arena Square site project. ....	12

## LIST OF PHOTOS

CONTENTS	PAGE NO
Photo 3.1 The picture shows the site organization on Arena Square.....	14

## **LIST OF APPENDIX**

### CONTENTS

Appendix A (1) details of concrete ground beam

Appendix A (2) details of Ground Beam

Appendix B (2) ground slab key plan: top bar

# **CHAPTER 1.0**

## **PREFACE**

### **1.1 INTRODUCTION**

Building construction is the process of adding structure to real property. The vast majority of building construction projects is small renovations, such as addition of a room, or renovation of a bathroom. Often, the owner of the property acts as labourer, paymaster, and design team for the entire project. However, all building construction projects include some elements in common - design, financial, and legal considerations. Many projects of varying sizes reach undesirable end results, such as structural collapse, cost overruns, and/or litigation reason; those with experience in the field make detailed plans and maintain careful oversight during the project to ensure a positive outcome.

Building construction is the techniques and industry involved in the assembly and erection of structures, primarily those used to provide shelter. Building construction is an ancient human activity. It began with the purely functional need for a controlled environment to moderate the effects of climate. Constructed shelters where one means by which human beings were able to adapt themselves to a wide variety of climates and become a global species. (Chang, 2014)

Building is some to extent determined by availability of material and skilled operatives, therefore local, regional and national factor will also be responsible for some variation. Supplementary study material and detail can be obtained from professional journals, legislative paper, manufactures product literature, the many cross-references in the text and attending exhibits and seminars. The most valuable learning resource is observing and monitoring construction in progress (Roy Chudley, 1982)

Building construction is procured privately or publicly utilizing various delivery methodologies, including hard bid, negotiated price, traditional, management contracting, construction management-at-risk, design & build and design-build bridging. (Wikiversity, 2016)

Civil engineering is the oldest and one of the most versatile branches of engineering. Every structure that we see around today is a creation of civil engineering. Civil engineering is the oldest and broadest engineering discipline among all the engineering fields. The field deals with the planning, designing, and construction of buildings and various other structures. From huge dams to sky high buildings, from suspension bridges to offshore drilling platforms, every physical concrete structure comes under civil engineering. (Raunekk, 2014).

Therefore, to provide building construction for residential building especially in Perak area in order to keep develop more building for citizen in future.

## **1.2 OBJECTIVE**

### **1.2.1 Aim**

To study the building construction of the deep foundation and the method statement of installation precast concrete pile in building at Arena Square, Gerik.

### **1.2.2 Objectives**

The report was prepared to satisfy the following objectives:

- a) To identify the criteria that should be considered in construction of precast concrete piling.
- b) To study the construction method of precast concrete piling for work below super structure in building.
- c) To determine the equipment and machineries used for construct a precast concrete pile.

### 1.3 SCOPE OF STUDY

This report provides information regarding implementation of the first stage structure work on the building construction of concrete pile on construction of Arena Square nearest with Dataran Lawin, Gerik. This stage involves the planning and a development activity associated with building construction and consists of two closely related processes

- i. Determining the type of material used.
- ii. Preparing and carrying out the construction works.
- iii. Factor the effecting the type of foundation.

## **METHOD OF STUDY**

### **1.3.1 Primary Data**

i. Interview

Interview sessions with several people who are responsible in charge on the site construction. Several of those people are the supervisor, sub – contractor, skilled worker, unskilled worker and more.

ii. Case Study

Case study was made by observation method during practical training through site visit. The information collected based on what happen at site construction guided by site supervisor. The technology as camera and cell phone was used to record any important information such as progressing of construction, equipment and machineries that used while construction.

### **1.3.2 Secondary Data**

The main reason for literature review is able to study and find out regarding the building construction about the step to construct a concrete pile, the material used and how to construct it through relevant books, articles and thesis at National library and UiTM Seri Iskandar library, Perak.

Several of the literature studies are from the document data on the generosity of the project assistant; quantity surveyor, Nurul Huda Binti Ahmad.



## CHAPTER 2.0

### COMPANY BACKGROUND

#### 2.1 INTRODUCTION OF COMPANY

Gemilang Aisy Sdn. Bhd. which is located in Ipoh, Perak, was registered on 26 May 2009. It is also 100% owned by bumiputera which very dynamic and progressive organization to become a leader in its industry.

Although newly established, it been able to compete with long-running companies as they have very strong of organization and professional staff in various fields as well as have strong support from reputable suppliers and contractors today.

With a dedicated workforce and an exacting standard for completion have gained the company a competitive edge well recognized in the industry. By the support of professional suppliers and contractors who are willing to work together with Gemilang Aisy Sdn. Bhd. They are confident of contributing all the expertise and experience in various fields to implement and complete the projects or contracts offered successfully.

Gemilang Aisy role include:

- i. Construction.
- ii. Design and build.
- iii. Land & Properties.
- iv. Supplier of material.

## **2.1 COMPANY PROFILE**

### **2.2.1 Owner**

Salomah Binti Abdul Samad @ Kadir. (Manager Director)

### **2.2.2 Year of Establishment**

26 May 2009

### **2.2.3 Company Vision**

To be an outstanding construction company that touches lives of people through services and values besides inspiring lives through premier lifestyle solutions.

### **2.2.4 Company Mission**

- i. Develop a potential for residential land complete with basic facilities, high technology in line with the needs of modern society.
- ii. Delivers quality products and services that enriches lives of customers
- iii. Undertake the latest construction technology.
- iv. Ensure that each project at the highest level at all times through a planned investment.

### 2.2.5 Prime Bank

RHB Islamic Bank Bhd, Gunung Rapat branch, Ipoh.

No. 57 & 59, Medan Gopeng, 1, Jalan Gopeng, Gunung Rapat, 31350 Ipoh,  
Perak

Phone:

CIMB Bank Bhd.

288, Jalan Gopeng, Gunung Rapat, 31350 Ipoh, Perak

Phone:

### 2.2.6 Official Logo & Symbols



Figure 2.1 Gemilang Aisy Sdn. Bhd. logo and symbols

Source: Gemilang Aisy Sdn. Bhd.

## ORGANIZATION CHART

### 2.2.7 Overall Gemilang Aisy Sdn. Bhd.

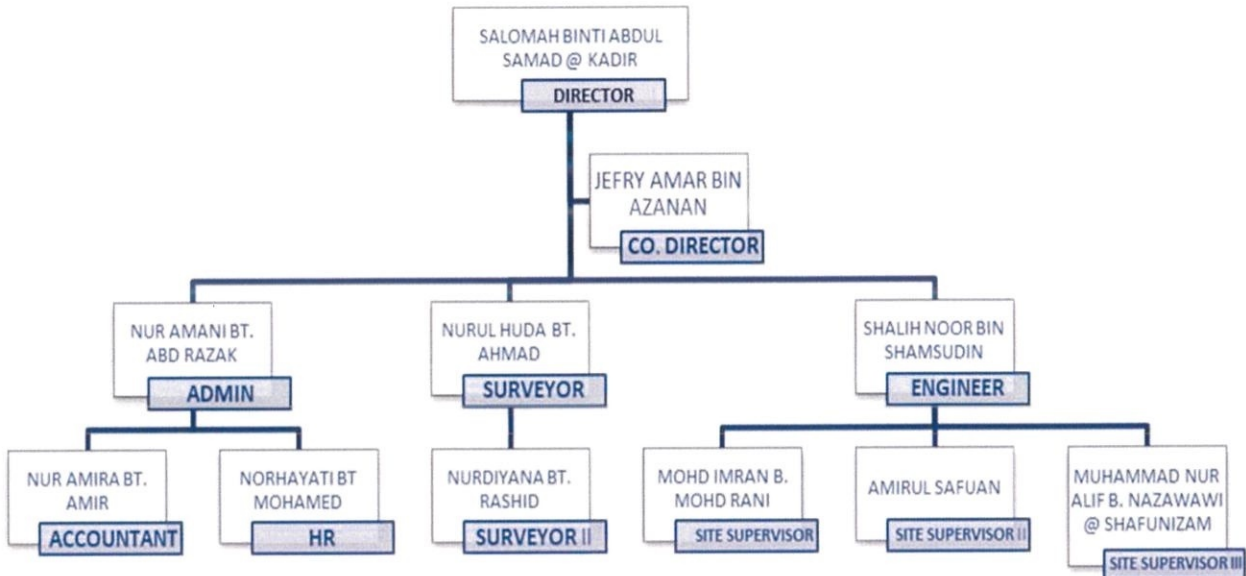


Figure 2.2 overall company organization chart.

The company is managed by director Pn. Salomah binti Abd. Samad@Kadir and assisted by En. Jefry bin Amar. Comprising of few departments, each department carry different scope of works and sort into different positions according to their skills and expertise.

For instance, Project Department team, led by the Senior Project Manager and supported by Project assistant known as surveyor is responsible in managing the project. Another department that plays a vital role in the company is the Contract and Procurement Department. These departments are in charge in managing works relating to contracts and procurement. Taking the lead is the director and administration of office and followed by surveyor II.

In addition, Finance & Information Technology Department is also another significant backbone to the company. Guided by accountant, the department consists of Pn. Nur Amira that manages financial and accounting works.

## 2.3 LIST OF PROJECTS

### 2.3.1 Completed Projects

Table 2.1 list of completed project

Bil.	Location	Client	Amount (RM)
1.	Membina Jalan Pintas Dari Jalan Perusahaan 1 ke Laluan Persekutuan 1 Daerah Kerian.	JKR, Daerah Kerian.	3,535,690.00
2.	Pembinaan SJK(T) Ladang Kota Bahroe, Perak.	Saitech Waste Water	4,230,000.00
3.	Membina Banglo 2 Tingkat Di Sungai Tapah.	Majlis Agama Islam, Perak	615,996.00
4.	Menaiktaraf Bangunan Dan Galeri Utama Di Galeri Arkeologi Lembah Lenggong.	Jabatan Warisan Negara	3,354,829.00
5.	Naiktaraf Dan Pembaikan Infrastruktur Kolej Komuniti Pasir Salak.	JKR, Perak Tengah	366,259.90
6.	Kerja Pembaikan Bumbung Di Dum.	Pusat Pemulihan Akhlak, batu gajah	44,200.00
7.	Merekabentuk, Membina, Menyiapkan Dan Mentauliahkan sebuah tangka Air di Uitm Seri Iskandar.	Uitm Seri Iskandar	1,237,729.14
8.	Mengubah suai tandas L&P serta student lounge di OUM Perak.	Open university malaysia	250,006.00
9.	Pembinaan Jalan Baru di KG Gajah ke Pekan Air Kuning	JKR, Batang Padang.	2,163,894.00
10.	Baikpulih Bangunan Asrama SMK Sultan Idris Shah II	JKR, Gerik	420,600.00

### 2.3.2 Project in Progress

Table 2.2 List of projects in progress

<b>Bil.</b>	<b>Location</b>	<b>Client</b>	<b>Amount (RM)</b>
1.	Menggantikan Jambatan Sedia ada di FT065/028/30 Hilir Perak	JKR, Daerah Hilir Perak.	3,000,689.00
2.	Membina dewan terbuka (Arena Square) di Dataran Lawin, Gerik perak.	Majlis Daerah Gerik	968,005.00
3.	Cadangan Mereka Bentuk Membina Dan Menyiapkan Bengkel FSSR, Uitm Seri Iskandar	Uitm Shah Alam	1,960,756.00
<b>Total</b>			5,929,450.00

## CHAPTER 3.0

### CASE STUDY

#### 3.1 INTRODUCTION OF PROJECT

##### 3.1.1 Introduction of

Federal development office, ICU Perak plan to develop this project after the big success of ARENA SQUARE, Sungai Siput which located in Kuala Kangsar. It consists of open hall for public used. The project started on February 2018 and expected to complete early of 2019.

Descriptions:

- Land Size: From 20' x 102'
- Built Up: 2,140 sq. Ft
- No of Bath: 4
- Price in contract: RM 2,820,835.96



*Figure 3. 1 The perspective view of Open hall Arena Square site project.*

Table 3.1 list of consultants

No.	Parties involved		Address
1.	Client	Pejabat Pembangunan Persekutuan Negeri Perak	Jalan Koo Ching Kong, 30000 Ipoh, Perak Darul Ridzuan.
2.	Main Contractor	Gemilang Aisy Sdn. Bhd.	69A, Persiaran Wirajaya Timur 23, Taman Panglima, 31350 Ipoh, Perak Darul Ridzuan
3.	Architect	Cityscape Architect	53A, Tingkat 1, Persiaran Dataran 4, Bandar Seri Iskandar, 32600 Bota, Perak Darul Ridzuan
4.	Civil & Structure Engineering	Pace Structures	3C, Jalan Tun Abdul Razak, Taman Idris, 30100 Ipoh, Perak Darul Ridzuan
5.	Mechanical & Electrical Engineers	KBM consult Sdn. Bhd.	No.4 Jalan Punca Setiawangsa 4, Taman Setiawangsa, 54200 Kuala Lumpur.
6.	Quantity Surveyor	AS2 Consult Sdn. Bhd.	No. 38A, Tingkat 1, Persiaran Dataran 3, 32610 Seri Iskandar.



MEMBINA DEWAN TERBUKA (ARENA SQUARE) MAJLIS DAERAH GERIK

CARTA ORGANISASI GEMILANG AISY SDN BHD

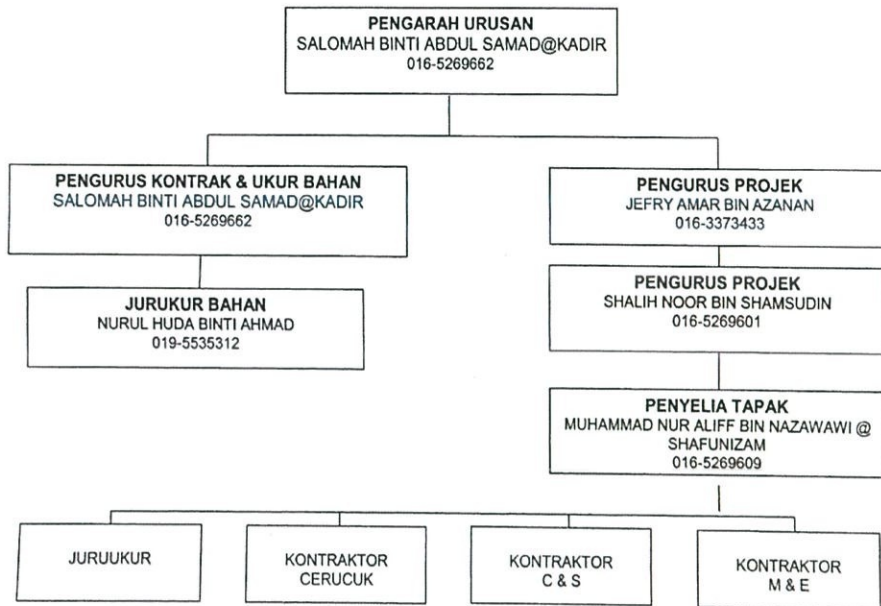


Figure 3.2 The picture shows the site organization on Arena Square.

A case study regarding the Arena Square, since the construction has just started when the date of practical. The works may start with site preparation and continued to foundation work then follow by ground slab work and so on.

Arena Square location is strategic and full of accessibility because it placed middle of Pekan Gerik, easy access to public and near with Bus station, 5 minutes to petrol pump, school, clinic and department of government. It really suitable for any big event and activities. Also every part of Perak district has their own Arena Square

For this case study, the focus will only be on the **construction of precast concrete pile** as suitable topic due to process of construction is not very complex and heavy. The concrete pile is the only works easy to conduct and manage.

## **3.2 CASE STUDY**

### **3.2.1 Deep Foundation**

Deep Foundation is a foundation type that exceeds the depths of 3 meters that is either driven into the ground towards the hardcore that can support the structure load or by friction and can be made from either timber, steel or precast concrete. The precast concrete type may vary in grades of concrete used depending on amount of load designed to be used for the foundation to be subjected upon. Deep foundation can also be bored into the ground and cast directly into the ground after placing a number of reinforcements according to the engineer specifications that is given in the drawing plan.

The case study is located at Gerik where it is intended for the construction of Dewan Terbuka (Arena Square). There were 3 stories to be constructed in an estimated time of 12 months in total. The type of pile used is Reinforced Concrete Pile varying of grade 25 to grade 30 depending on the structural purposes and is precast from the factory mild steel end cap for coupling of pile purposes installed. The average depth of the pile driven into the ground into the ground is around 28 meters.

The method used for driving the pile is by hammering it straight towards the desired depth according to the engineer's specification. The weight of the hammerhead is around 3 tonne and is lifted from the top of the pile head at height ranging from 200mm-300mm in height. Piling works needs to be constantly supervised to ensure the safety of the pile itself to prevent cracks or even pile failure that may occur above ground or under the ground level where it is impossible to see the damage. However, test such as the Piling Integrity Test or also known as P.I.T can be conducted to check whether the pile has broken underground or not. In case of pile failure, a new point needed to be driven at the distant of 500mm from the original location under the approval of the structural engineer.

### 3.2.2 Type Piling

The type of concrete pile is the most used in building construction. It The range of piles in common use includes wood piles, prefabricated concrete piles, driven and cast-in-place concrete piles, bored and cast-in-place (non-displacement) piles, steel piles, and specialty piles. This overview will give you a better idea of which piles should be used in different conditions. In addition, it also acts to bear all the loads come from the wall which constructed parallel with the beam.

A concrete normally should consist of following items;

- i. Reinforcements
- ii. Concrete
- iii. linked

Piles shoes be placed at below piles before bored. The sizes of main reinforcement play important role in determine the strength of a beam. There many type of piles that have different function and the bearing strength.

There are 5 type piles;

- 1) End Bearing Piles
- 2) Friction Piles
- 3) Compaction piles
- 4) Sheet Piles
- 5) Cohesion piles

### **3.2.3 Factor of Selected Pile**

- i. Suitable for various type of soil condition

RC Piles are manufactured in sizes ranging from 150mm x 150mm to 400mm x 400mm. To suit different soil and design conditions. As for the results, the construction progress project could be carrying out more fasters. Since it developing smoothly the construction project can be done according to the schedule if the site does not face any circumstances for the further time.

- ii. Hold adequate load bearing capacities

RC Piles are engineered to withstand impact during driving in process. This facilitates the economical design of foundations to suit varying soil conditions. So, it would be last longer.

- iii. Economical In cost

RC Pile is classified as most economical in cost to most contractors because the material required for manufacture is easily obtainable. This could help make the work become faster and smooth.

#### iv. Design and Criteria and Selection of Foundation Pile

The selection criteria of foundation for buildings are depends on two factors, related to the ground (soil) conditions and factors related to loads from the structure. The performance of foundations is based on interface between the loadings from the structure and the supporting around or strata. The nature and conditions of each of these varies, so the selection of appropriate foundation becomes necessary for these variations depending on circumstances. Ground and soil condition is necessary for determining the type of suitable foundation. As for, the industrial, commercial or residential building, the soil may be stable, level and in uniform composition, but in other conditions it might be different.

Below are the criteria for selecting suitable foundation based on soil condition:

- i. If the soil is closed to the surface it would capable of supporting structural loads, shallows foundations can be provided.
- ii. Where the ground close to surface is not capable of supporting structural loads, hard strata is searched for, and in some cases, it may be very deep, like in case of multi-storey buildings, where loads are very high. In conclusion, deep of foundations are suitable for such cases.
- iii. Field up ground have low bearing capacity, so deep foundation is required at the place, whereas uniform stable ground needs relatively shallow foundation.

Selection of pile foundation types depends on following conditions:

- i. Superstructure design
- ii. Site area
- iii. Soil condition
- iv. Surrounding building and structure
- v. Availability of equipment and site constraints

### 3.3.4 Problem and Solution

i. Condition of Soil

The structure of the soil at the site location is gravel and rocky. This may make it difficult to digging the ground. It also may take a long time to finish for each work. Before start the construction, make an investigation about the type of soil and character. Through this investigate it also the factor to choose the type of foundation and the suitable machineries to avoid damage and incident at the site.

ii. Unpredictable weather condition.

When the raining occurs, it really disturbs the time of progression and also the material of construction. Do refer to weather condition before arrange the work schedule. During rain make sure to protect the material at the safe place such as at temporary stores.

iii. Piles Driving Out of Alignment or Location.



Piles may be moving out of alignment due to hammer-pile alignment control or factor of soil conditions. If due to poor hammer-pile alignment control, a pile gate, template or fixed lead system may improve the ability to maintain alignment tolerance. Soil conditions such as near surface obstructions or steeply sloping bedrock having minimal overburden material may prevent tolerance from being met.



iv. Piles Driving Significantly Deeper Than Estimated.

Soil resistance at the time of driving could be lower than anticipated or driving system performance is better than anticipated. If the ultimate capacity based on restrike blow count is still low, check drive system performance and restrike capacity with dynamic measurements. If drive system performance is as assumed and restrike capacity low, the soil conditions are weaker than anticipated. Foundation piles will probably need to be driven deeper than originally estimated or additional piles will be required to support the load. Contact the structural engineer/designer for recommended change.



**3.3 METHOD STATEMENT**  
**3.3.1 Construction of Piling at Arena Square, Gerik.**

**DATE:** 16/10/2018 – 26/12/2018



No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration
1.	Layout Pile position and establishment of TBM.	The position of each pile must be set according to the drawing plan. Temporary Bench Mark also need to be established in order to determine the cut off levels of the piles.	 <p style="text-align: center;">Photo. 3.2</p>	1. Levelling Instrument 2. Theodolite Instrument 3. Point marking 4. Construction Drawing.	2 Site supervisors 1 Site Surveyor 4 Labourer	4 Days
2.	Piling Rig and Drop Hammer setup and inspection.	A mobile Drop Hammer machine will be set upright at the desired piling position.  The verticality of the Piling Rig can be observed by the naked eyes.  Other than that, the application of plumb bob or spirit level is advised	 <p style="text-align: center;">Photo. 3.3</p>	1. Drop hammer Rig. 2. Plumb Bob. 3. Spirit level	2 Site Supervisor 1 Safety officer 1 Machine Operator 1 Labourer 1 Machineries Inspector.	30 minutes

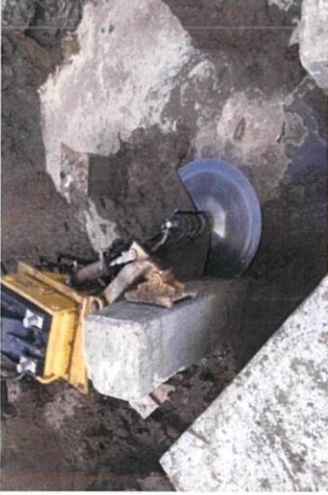
No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration
3.	Marking the pre-cast pile.	<p>A labourer then will make a marking along the pile section with a red paint.</p> <p>This is done in order to enhance the recording method of the pile penetration and serve as a rough penetration guide.</p>	 <p>Photo. 3.4</p>	<ol style="list-style-type: none"> <li>1. Brush</li> <li>2. Paint</li> <li>3. Drop Hammer Rig.</li> <li>4. Glove.</li> </ol>	<p>2 Site Supervisor 1 Machine Operator 1 Labourer</p>	5 minutes
4	Hoisting the pile into the Vertical Drop Hammer.	<p>A worker will then attach the pile with a cable located behind the Vertical Drop Hammer instrument and guide the Piling into the Vertical Drop Hammer instrument.</p> <p>The verticality of the pile will be observed to make sure the pile is straight.</p>	 <p>Photo. 3.5</p>	<ol style="list-style-type: none"> <li>1. High tensile Cable.</li> <li>2. Drop Hammer Rig.</li> <li>3. Hook.</li> <li>4. Spirit level. Plumb Bob.</li> </ol>	<p>2 Site Supervisor 1 Machine Operator 1 Labourer.</p>	10 minutes



No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration
5.	Driving the pile into the ground.	By using the Piling Rig, the pile hammered into its servicing depth or until it reaches the estimated Hard-core layer depth of 30 m into the ground. Supervisor monitors the penetration of pile.	 <p style="text-align: center;">Photo. 3.6</p>	1. Drop Hammer Rig.	2 Site Supervisor 1 Machine Operator 1 Labourer	45 minutes.
6.	Welding the pile to increase the penetration depth.	To increase the lengthening and strengthening of pile penetration ability another new pile must be attached at the top part by just simply weld both the new pile head joint to the pile head at ground and insert the Reinforcement into a hole at the top part of the joint.	 <p style="text-align: center;">Photo. 3.7</p>	1. Welding machine. 2. Drop Hammer Rig.	2 Site Supervisor 1 Machine Operator. 1 Labourer.	20 minutes

DATE: 16/10/2018 – 26/12/2018

No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration
7.	Coat the welded layer.	<p>The welded layer is then coated with a layer of anti-rust layer.</p> <p>Continue hammering the pile into the ground and if pile lengthening work is necessary repeat the lengthening, welding and paint coating steps.</p>	 <p style="text-align: center;">Photo. 3.8</p>	<ol style="list-style-type: none"> <li>1. Brush</li> <li>2. Paint</li> <li>3. Drop Hammer Rig.</li> <li>4. Glove.</li> </ol>	<p>2 Site Supervisor</p> <p>1 Machine Operator</p> <p>1 Labourer</p>	5 minutes.
8.	Taking the displacement Graph.	<p>After the Pile had reach its penetration limit. A displacement graph of the pile must be taken.</p> <p>Hold one end of a pencil supported firmly on a timber board. Mark the pile displacement onto a graph paper that is adhere onto the pile for 10 blows.</p>	 <p style="text-align: center;">Photo. 3.9</p>	<ol style="list-style-type: none"> <li>1. Pencil</li> <li>2. Graph paper.</li> <li>3. Glove.</li> <li>4. Timber block.</li> <li>5. Drop Hammer Rig.</li> </ol>	<p>2 Site Supervisor</p> <p>1 Machine Operator</p> <p>1 Labourer</p>	10 minutes

No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration
9.	Cut off the excess piles.	By using the cutting tools, the excess piles were cut off according to the needs of each pile's length.	 <p style="text-align: right;">Photo. 3.10</p>	<ol style="list-style-type: none"> <li>1. Cutting tools.</li> <li>2. Measuring tape.</li> <li>3. Gloves.</li> <li>4. Goggle.</li> <li>5. Mask.</li> </ol>	2 Site Supervisor 1 Machine Operator 1 Labourer 1 Machine Inspector	30 minutes

DATE: 16/10/2018 – 26/12/2018

No.	Task	Method	Diagram	Machineries/Tools	Manpower	Duration.
10.	Make Pile cap for the pile.	<p>After all the excess piles are cut off. They then constructed the pile capping.</p> <ol style="list-style-type: none"> <li>1. Excavate the pit.</li> <li>2. Install pile cap formwork.</li> <li>3. Install the pile cap reinforcement.</li> </ol>	 <p style="text-align: right;">Photo. 3.11</p>	<ol style="list-style-type: none"> <li>1. Hydraulic bar bending</li> <li>2. Excavator.</li> <li>3. Cutter.</li> <li>4. Formwork.</li> <li>5. Reinforcement.</li> </ol>	<p>2 Site Supervisor            1 Machine Operator            1 Labourer            1 Engineer            1 Safety Officer</p>	39 days

## **CHAPTER 4.0**

### **CONCLUSION**

#### **4.1 CONCLUSION**

Overall after involvement in this construction, pile is the important major things that used in high rise building construction structure. A proper care for the material with the factor of choosing type of pile is a must suitable with the building and soil, so that it would not cause problem in the future. A few criteria have been established when implement of concrete pile is installed.

The main criteria that had been applied to this type of precast concrete pile along the construction at Open Hall Arena Square are the factor of choosing type of pile. Besides that, it must in a good condition and arranged accordingly to the correct place based on the drawing plan. They are choose the precast concrete piles cause of the type of building, the type of soil and the cost of project. According to this project of Arena Square the type building is a big structure so precast concrete pile is the most suitable material for the base. This small mistake needs to be avoided because it might cause a long-term problem, especially in a few years due to suitability of material used.

In completing this report, the method of installation of precast concrete pile in explained in detail. The construction of precast concrete pile starting with pointing out the location of pile, set up the Temporary Bench Mark (TBM) also need to be established in order to determine the cut off levels of the piles. After that, Piling Rig and Drop Hammer is setting up and inspection to ensure in safe position. From this process I have been observed the machine and equipment.

The other criteria that should be coincided in installed the precast concrete piles also the suitability of concrete grade. Precast concrete pile at Arena Square building can bear the weight of everything that is placed on top it so the grade of the concrete must be suitable specially to compliment the weather on the site. Thus, the correct concrete grade will help in maintaining the quality of concrete slab.

In site there are many machineries such as, drop hammer rig, welding machine and bar cutter was used while the construction. This equipment and machineries will give new experience and knowledge for observe how the machines are implementing in site. The surroundings of site construction full with equipment like nail, hammer, and reinforcement bar. This situation will be created intention to be a learn more precaution and develop this skill using this equipment for benefit.

For safety and health, it can be concluded that construction site area is safe to enter. All the workers here are wearing personal protective equipment (PPE) and protective clothing. Injuries, fatal cases or hazard can be occurring during the construction work process. Therefore, it is recommended to all parties to taken safety precaution regarding the installation of precast concrete pile to minimize other contribution factor in building defect and human injury

In the nut shell, it important to choose the right type of pile base on the criteria that had been considered which to prevent any problem along the construction.

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## APPENDIX



