



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

**THE CONSTRUCTION OF GROUND FLOOR SLAB FOR
ADMINISTRATION BUILDING, SAKJ LEBAI MOHD YAAKOB, AYER
BALOI, PONTIAN, JOHOR**

Prepared by:

SITI NUR AZIRAH BINTI BACHOK

2016614336

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

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It is recommended that the report of this practical training provided

By

Siti Nur Azirah Binti Bachok

2016614336

entitled

**The Construction of Ground Floor Slab For Administration Building, Sakj
Lebai Mohd Yaakob, Ayer Baloi, Pontian, Johor**

accepted in partial fulfilment of requirement has for obtaining Diploma in Building

Report Supervisor

Dr. Asmat Binti Ismail

Practical Training Coordinator

En. Muhammad Naim Bin Mahyuddin

Programme Coordinator

Dr. Dzulkarnaen Bin Ismail

DEPARTMENT OF BUILDING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

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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 Noor Al-Amin Bin Yunos Sdn Bhd for duration 14weeks starting from 3 September 2018 and ended on 7 December 2018. It is submitted as one of the prerequisite requirement of DBG 307 and accepted as a partial fulfilment of the requirement for obtaining the Diploma in Building.

Name : Siti Nur Azirah binti Bachok

UiTM ID No. : 2016614336

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

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ABSTRACT

Ground floor slab is structural element that made from concrete usually, and its used to create flat horizontal surfaces. Concrete floor slab can be in situ or prefabricated. The in situ concrete slab floor are built using formwork, which is commonly made of wooden, planks, board, plastics or steel and reinforcing steel for slab surface. However, in this report, the study is mainly focused on constructing the ground floor slab at for educational building. the objectives of this report are to study construction method of the ground slab and determine machinery and equipment that used in process of construct the ground slab with their function of machine. To achieve the aim and objective, three methodology were undertaken by observing the construction site, making interview with labour and project manager, and reviewing the related documents such as architectural construction drawing. The construction of ground floor slab at educational building can be a strong foundation slab that carry significant building column and wall loads that are visually acceptable.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

Generally, slab are defined as structural element that made from concrete usually, and its used to create flat horizontal surfaces such as floors, roof deck and ceiling. A slab generally several inches thick and its supported by beams, column, walls, or the ground. (<http://www.designbuildings.com>)

Concrete slab a very common and important structural element, the depth of a concrete slab floor is very small compared to its span, may be supported on two sides only or have beams on all four sided. Concrete slab may be supported by:

- i. Masonry or reinforced concrete wall
- ii. Structural steel members
- iii. Columns
- iv. On the ground

In construction industry, there are a few types of slab that usually have seen in Malaysia such as flat slab, one-way slab, two-way slab, flat slab, and waffle slab. In Malaysia slab are usually made from concrete because it more strength and easy to construct somehow as in situ or precast concrete slab.

Concrete floor slab can be in situ or prefabricated. The in situ concrete slab floor are built using formwork, which is commonly made of wooden, planks, board, plastics or steel and reinforcing steel for slab surface. (<http://www.civiltoday.com>)

In-situ concrete slab are built on the construction site using formwork ad if the slab is to be reinforced, the rebars, or metal bars it positioned within the formwork before the concrete is poured in. Meanwhile, for the ground slab the formwork may consist only of side walls pushed into the ground. For a suspended slab, the formwork may shaped like a tray, that often supported by a temporary scaffold until the concrete are sets.

1.2 Scope of Study

The study is done mainly during the duration of practical training which started on 3 September 2018 until 7 December 2018. The aim and focus of this study is constructing the ground slab at Administration Building, SAKJ Lebai Mohd Yaakob, Pontian. The components that are emphasized in this study were the correct method of construct the ground floor slab. Other than that, the use of machineries or equipment and their function are also studied during this study.

This study is conducted to understand the method of constructing ground floor slab for educational building. The study was carried out at SAKJ Lebai Mohd Yaakob Di Atas Lot 10362 dan Lot 10363, Mukim Ayer Baloi, Daerah Pontian, Johor. The name of this project is Cadangan Merekabentuk, Membina dan Menyiapkan Kerja Pengambilalihan Projek Sekolah Agama Negeri Johor (SAKJ) Fasa 5 Di Dalam Negeri Johor Darul Takzim.

This project is supposed started on 4 September 2017 and ended on 3 September 2018, but this project was delays for 3 months and getting starts on 1 January 2018 and is scheduled for completion on 3th September 2019. This project that being built is construct the 2 main block which is Academic Building, Administration Building and garbage house. This project also will be equipped with parking area and other facilities. This project are also involve preliminaries, piling works, building works, external works, mechanical and electrical works and provisional sum.

The client of this project is Unit Perancang Ekonomi Negeri Johor. The main contractor of this project is Kumpulan Prasarana Rakyat Johor (KPRJ) and this project was constructed by Noor Al Amin Bin Yunos. There are thirty religious schools are being built around the state of Johor. Before this, Unit Perancang Ekonomi Negeri Johor, KPRJ, and Noor Al Amin's company have worked together built several buildings for public use such as Masjid Jamek Teluk Kerang where located at Pontian, Johor.

1.3 Objectives

- i. To identify the construction method of the ground slab.
- ii. To investigate the machinery and equipment that used in process of construct the ground floor slab with their function of machines.
- iii. To determine the advantages and disadvantages construction of concrete ground slab in construction industry.

1.4 Method of Study

1.4.1 Observation

The observation on site has been chosen as the method to investigate the study. Observation has made at construction site which is located at SAKJ Lebai Mohd Yaakob, Mukim Ayer Baloi, Pontian while industrial training there.

The observation made during the labour in construction activity. Each process will be reviewed and recorded to obtain the correct information.

1.4.2 Interview

Interview session with several people who responsible in charging on the site construction and another labours that worked at site to get the information for the case study. Several people that involved in this interview session is Project Manager, Site safety and health and skilled labour that worked on site. The information shared and will more understand to describe or learning in any of process that being build on site.

Project manager, En. Muhammad Shafiq Bin Noor Al-Amin is the one person that will give the clear instruction and information about the work or process. The interview that have done will makes more understand and can get new knowledge indirectly.

Interview is the best method of study that it will help to understand to investigate the process or the actual way of construct an element at construction site so that no errors will occurs.

1.4.3 Document review

Review the document related on site office is the method of study that has been chose to get an information. The example of document that needed is company profile, construction drawing, and monthly progress report.

Indirectly, from document review method, its consists many information that are needed in case study and its help to more understand in the current process at construction site. An example, from reviewing the construction drawing, it will help to more get know about the size and types of material used on sites.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of The Company

Noor Al Amin bin Yunos is of the renowned contractor companies in the vicinity of Pontian, Johore. The company was fully administrated by Hj. Noor Al Amin bin Yunos who acted as a Director of The Company. This company has been registered with Suruhanjaya Syarikat Malaysia (SSM) on 1 October 1987 has also been registered with CIDB on 20 September 1998.

At the beginning of the establishment, this company is only known as a Class F contractor and only does small construction work around the Pontian area. Then, on 2 March 2000 Noor Al Amin Bin Yunos's company was upgraded to a class D/ Grade G3 contractor which enables this company to undertake large-scale construction work. This company give priority to general construction works, civil engineering, road pavement, water supply, sewerage, drainage, landscaping and so on. In fact, the company is also actively involved in executing contract work related to Syarikat Air Johor (SAJ), Jabatan Pengairan dan Saliran, Jabatan Kerja Raya (JKR), Pejabat Daerah, Majlia Bandaraya and others as the main contractor.

The reputation of Noor Al Amin Bin Yunos's Company getting stronger and receiving various construction project from year to year. It is not just accepting offers from the Pontian area, but also offered construction works outside the districts such as Kulai and Johor Bahru. Now, Hj Noor Al Amin is assisted by his two sons to manage the project site and act as a Project Manager and Site Safety and Health Supervisor.

All the necessary of machinery on site for construction work will be provided by Warisan Daing Enterprise which is also a subsidiary of the company Noor Al Amin bin Yunos. Warisan Daing Enterprise provides renting and using a complete construction machinery required by the customer.

2.2 Company Profile

Figure 2.1 shows the Company's Logo develop this company.



Figure 2.1 Company's Logo

The description of company profile is shown in Table 2.1.

Table 2.1 Details of Company Profile

Item	Details of the company
Company's Name	Noor Al Amin Bin Yunos
Business Address	No 3, Lorong Mat Kilau, Jalan Kayu Ara Pasong, 82000, Pontian, Johor
Tel. No	
Fax No.	
E-mail	nooralaminbinyunos9166@gmail.com
Types of Company	Sole proprietorships
Main Business	Contractor, Engineering and Development
Contractor's Registration Number (PKK)	1961001 – JH007161
Grade	G3
Status	Bumiputera
CIDB Registration Number	1961001 – JH007161
Category and specialization	B – B04, B02, B13, B14 CE - CE21, CE01, CE13, CE34, CE36
Bank	CIMB Bank Berhad 742, Wisma Koperasi, Jalan Taib, 82000, Pontian Kechil, Johor
Capital	RM 200, 000.00

The description of owner Noor Al Amin Bin Yunos is shown in Table 2.2.

Table 2.2 Details of owner Noor Al Amin Bin Yunos's company.

Item	Details
Owner's Name	Tn. Hj. Noor Al Amin bin Hj. Yunos
Citizen	Malaysia
Race	Malay
Home Address	No 3, Lorong Mat Kilau, Jalan Kayu Ara Pasong, 82000, Pontian, Johor
Birth's Date	16 August 1965
Gender	Male
Hp . No	
Tel / Fax No.	
Status	Married
Academic Qualification	SPM

2.2.1 Company Vision

- i. Provide the best services to make a famous and competitive company.
- ii. Providing skilled, quality and responsible workers to keep company activities running smoothly.
- iii. Perform the work that is entrusted with dedication.
- iv. Provide the best service for all customers.

2.2.2 Company Mission

- i. We are committed to making the company more qualified, competitive and deliver quality service to every customer.
- ii. Ensure the presence of our company is acceptable and become an example to young entrepreneurs in future.
- iii. Ensuring our company be the best development company in Johor especially and in Malaysia as well as in the next five years.

2.2.3 Objective company

- i. Providing more employment opportunities to younger generations and reducing unemployment among graduates.
- ii. Become a company that cares for customer satisfaction and company staff.

2.2.4 Company's Motto

“Quality beyond quantity”

2.3 Organization chart

Figure 2.2 shows the organization chart of the company that prepared by Noor Al-Amin Bin Yunos's company. This chart shows the organization of the staff

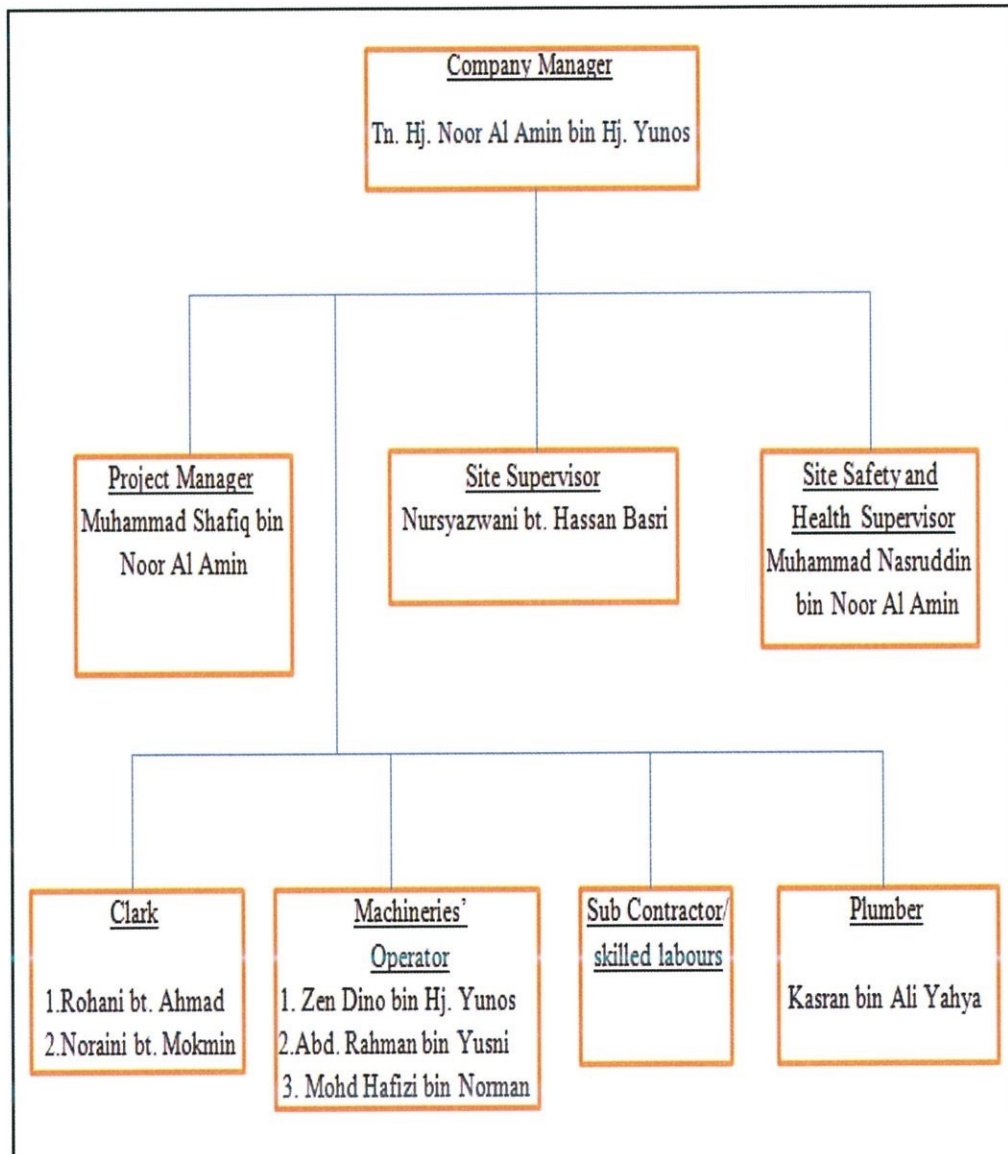


Figure 2.2 Organization chart of the company

This company also provide the site organization chart. Figure 2.3 shows the site organization chart that is needed at construction site.

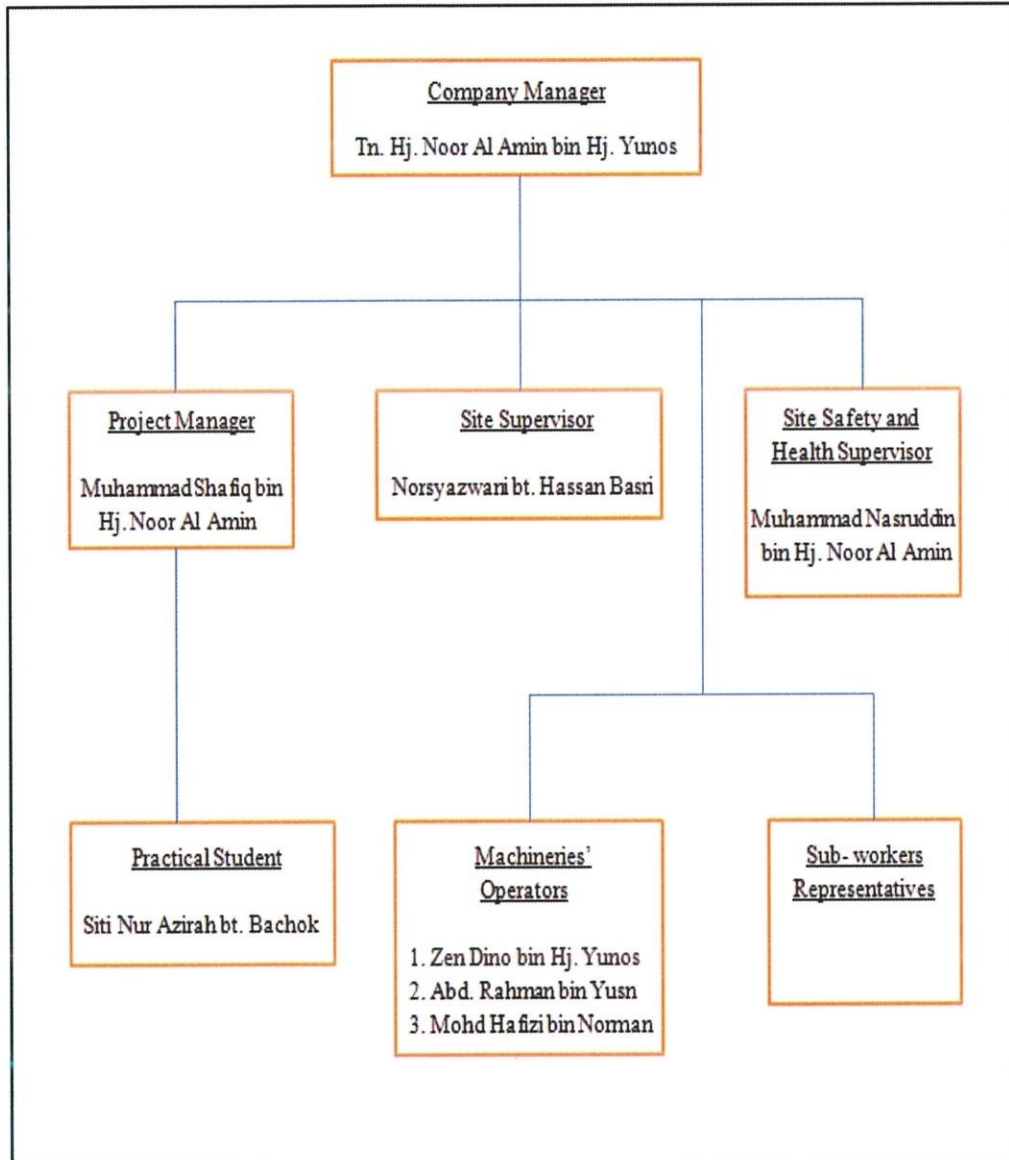


Figure 2.3 The organization chart of the company on site

2.4 List of project

2.4.1 List of completed project.

List of the completed project that which has been completed by Noor Al Amin Bin Yunos's company is shown in Table 2.3.

Table 2.3 list completed project

No	Name of Project	Contract price	Start	End
1.	Kerja-Kerja Menaiktaraf Laluan Pejalan Kaki Di Jalan Ismail, Pontian	RM 538, 060.00	23 July 2012	9 October 2012
2.	Kerja-Kerja Menaiktaraf Jalan Dan Kerja-Kerja Berkaitan Di Pusat Perdagangan Pontian	RM 887, 804.15	27 May 2013	15 July 2013
3.	Cadangan Menaiktaraf Longkng Konkrit Di Kampung Desa Idaman, Bukit Batu, Daerah Kulaijaya	RM 552, 753.00	14 September 2015	20 December 2015
4.	Cadangan Membina Dan Menyiapkan Sebuah Masjid Serta Kemudahan-Kemudahan Berkaitan Di Kampung Teluk Kerang, Mukim Rimba Terjun, Daerah Pontian, Johor Darul Takzim	RM 3,652,422.00	14 July 2016	12 July 2017

2.4.2 List of project in progress.

List of the project in progress which is being built by Noor Al Amin Bin Yunos's company is shown in Table 2.4.

Table 2.4 list of project in progress

No.	Name of Project	Contract Price	Start	End
1.	Cadangan Merekabentuk, Membina Dan Menyiapkan Kerja Pengambilalihan Projek Sekolah Agama Negeri Johor (Sakj) Fasa 5 Di Dalam Negeri Johor Darul Ta'zim	RM 3,408 363.22	4 September 2018	3 September 2019
2.	Kerja-kerja penyelenggaraan dan kerja berkaitan di Taman Saujana, Kota Tinggi, Johor	RM 783, 927. 48	28 November 2018	19 December 2018

Chapter 3.0

The Construction of Ground Floor Slab for Administration Building at SAKJ Lebai Mohd Yaakob

3.1 Introduction to Case Study



Photo 3.1 Front elevation of the site project

This site project is located at SAKJ Lebai Mohd Yaakob Di Atas Lot 10362 Dan Lot 10363, Mukim Ayer Baloi, Daerah Pontian. This site has been chosen as case study place. This project is a project Cadangan Merekabentuk, Membina Dan Menyiapkan Kerja Pengambilalihan Projek Sekolah Agama Negeri Johor (SAKJ) Fasa 5 Di Dalam Negeri Johor Darul Ta'zim. This site is located behind of Masjid Mukim Ayer Baloi and Sekolah Menengah Kebangsaan Ayer Baloi. The access to the site is quite complicated and busy because the site located at nearest main road and in Ayer Baloi town. Figure 3.2 shows the location map of construction site. Figure 3.3 shows the key plan and location plan of the project that located in Ayer Baloi, Pontian.



Figure 3.1 Location map of construction site.

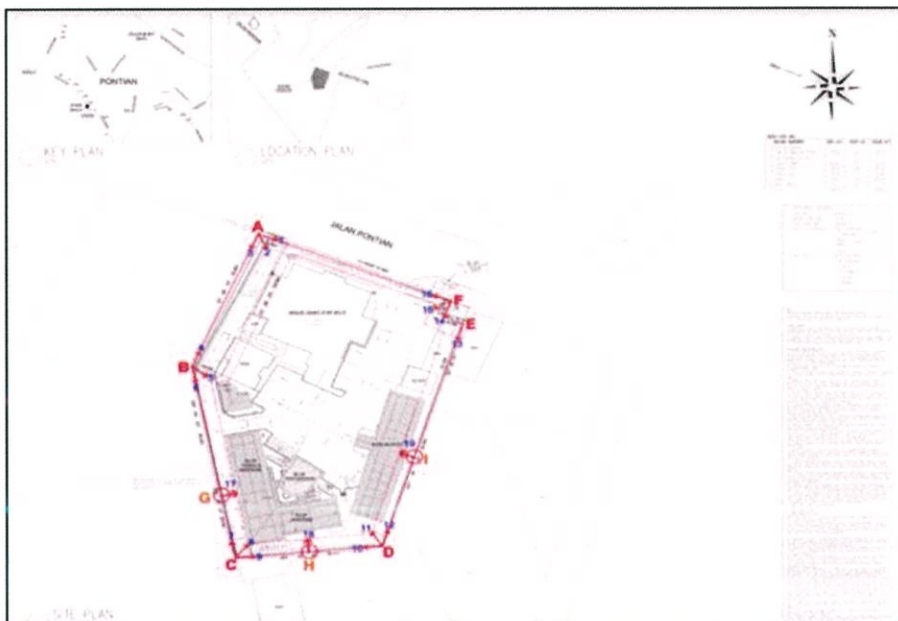


Figure 3.2 Key plan of the project.

The value of this project is RM 3,408 363.22 and this project takes 21 months to complete. The project started from 1st January 2018 and project is scheduled for completion on 3rd September 2019. The building being constructed consists of 2 block of building, which is academic building and administration building, a garbage houses and complete with parking area. There are 12 classes, a kindergarten, and canteen to be placed in academic building while the teacher room, principal room, library and pantry will be placed at the administrative building. Furthermore, this academic building is estimated to accommodate 400 students.

The client of this project is Unit Perancang Ekonomi Negeri Johor and the design and build contractor is Kumpulan Prasarana Rakyat Johor (KPRJ). There are 30 religious schools being construct in states of Johore and Noor Al Amin bin Yunos's company are chosen as sub-contractor to builds this project. Photo 3.2 shows the signboard of this project that placed at construction site.



Photo 3.2 Project Signboard

The scope of study is focusing on construction method of ground floor slab in SAKJ Lebai Mohd Yaakob, Ayer Baloi, Pontian. Ground slab which has been built in Administration Building and it consists of a one-way slab and two-way slab that has been described on a plan. This construction of ground floor slab takes about 8 days until the formwork is opened by the carpenters.



Figure 3.3 Architect impression of the front view of the building.

Source: www.muafakatjohor.com

3.1.1 Project Description

Project Title	: Cadangan Merekabentuk, Membina Dan Menyiapkan Kerja Pengambilalihan Projek Sekolah Agama Negeri Johor (Sakj) Fasa 5 Di Dalam Negeri Johor Darul Ta'zim (Sakj Lebai Mohd Yaakob Di Atas Lot 10362 Dan Lot 10363, Mukim Ayer Baloi, Daerah Pontian)
Design & Build Contractor	: KPRJ BUILDERS SDN BHD
Contract No. (LOA Ref. No.)	: KBSB/PR/HQ/01/17-SC01
Client	: UNIT PERANCANG EKONOMI NEGERI JOHOR
Architect (S.O)	: MRH RASHIDI ARCHITECT
C&S Consultant	: RAF CONSULT
M&E Consultant	: JURUTERA BUDIMAN (M&E) SDN BHD
QS Consultant	: KAS JURUKUR BAHAN
Sub-Contractor	: NOOR AL-AMIN BIN YUNOS
Contract Start Date	: 04 SEPTEMBER 2017
Contract Completion Date	: 03 SEPTEMBER 2018
Contract Duration	: 21 months
Contract Sum	: RM 3,408 363.22
Liquidated Ascertained Damages (L.A.D)	: RM 1,000.00/ day
Defect Liability Period (D.L.P)	: 24 months

3.2 Method of Construction of Ground Floor Slab

1. Ground beam and formwork.

In ground slab construction, ground beam is the important element that needed before construct the ground slab. It is because ground beam is the element that which will support the ground beam being built. Figure 3.3 shows the ground beam has been completed concrete before constructing the ground floor slab works starts.

After the ground beam has been constructed, the formwork was prepared by the skills labour before the backfilling soil works starts. The formwork has been constructed at construction site is for as a mould before pouring the concrete. Photo 3.3 shows the ground beam and formwork that has been prepared by the skilled labours.



Photo 3.3 Ground beam has been completed from top view

2. Backfilling soil and gravel.

Preparing soil before starting to construct the ground slab are very important to give the compressive strength. Back filling work is to compact the soil before any works on it. This process need the machinery such as excavator and backhoe for back filling the soil work and this is the first stage of construct the ground slab.

In this process, the top soil was excavated 150mm thickness using the backhoe. Backfilling soil process to get the specific depth, widths and backfill specifications that provided from engineer. This process is before filling the gravel that required for make sure the soil can be compact with properly. Photo 3.4 shows the operator of excavator and backhoe excavates the soil.



Photo 3.4 Excavator and backhoe operators doing excavating and backfilling soil work

3. Filling the gravel on the ground.

After back filling the soil, the machinery such as backhoe, excavator and mobile crane will used for back filling the gravel on top surface of soil. This activity are for make the soil get the specific thickness and will be more compact before construct the ground beam.

In this process, the gravel was delivered by the backhoe to concrete bucket which attached to the mobile crane. After that, that gravel was delivered by the mobile crane to the area involved for backfilling and compaction soil. Photo 3.5 shows the backhoe is filling the gravel into the concrete bucket.



Photo 3.5 The backhoe filling the gravel into concrete bucket

The gravel was poured on the ground and the thickness 30mm by the labours above ground level and which is less elevated for compaction this is to get the flat surface of ground before curing the concrete on it. After that, the gravel that on the ground has been levelled by the labour before compaction process.



Photo 3.6 Skilled labour poured the gravel above the ground

4. Compaction soil

After backfilling process, compaction soil need to be done with properly to make sure the soil really be in compact condition and no any problems will consist when the slab has been construct.

In compaction soil process, the plate compactor machine used to compact the soil. A skilled labour will use this machine to compact the soil properly and the surfaces of soil will be more compact and smooth before installing the barrier on it surfaces.



Photo 3.7 Plate compactor machine to compact the soil

5. Anti-termite

One of important process after compacting soil is the application of anti-termite. anti-termite is a process which soil treatment is applied in early stages of construction such as this process was applied after compacting soil process.

In this construction site, anti-termite diluted with water at a rate of 1:49. After that, the anti-termite was sprayed on the ground floor slab that being construct area by a skilled labour. This process is important to provide the building with the chemical barrier against the sub-terrain termites. Photo 3.8 shows a skilled labour sprayed the anti-termite on the ground.



Photo 3.8 skilled labour spray anti-termite

6. Installing damp proof membrane

After applied the anti-termite, the surface of the ground was covered with damp proof membrane (DPM). This surface was covered by polythene sheet covering is to prevent the transference of water and water vapour through the foundation into the building. The types of DPM that have been used at construction site that has been chosen as case study place is polythene sheet covering.

The polythene sheet covering has been cut by skilled labour according to the size of the ground floor slab and placed that DPM at not exceeding 150mm on the ground surface that has been sprayed with anti-termite and to be concrete. Figure 3.9 shows the skilled labours cut and placed the DPM before installing the BRC on it.



Photo3.9 Polythene covering sheets (DPM).

7. Installing and tying the BRC.

The BRC has been installed by the skilled labour after install the polythene sheet covering as a DPM. Like DPM, the BRC has been cut by the labour by using the bolt cutter according the size of the polythene sheet covering that has been installed on the ground.

The function of this BRC for ground floor slab construction is as a tension device in reinforced concrete to strengthen and aid the concrete under the tension. The size of BRC that has been used at construction site is 120mm × 120mm square BRC. Based on information at construction site, this are usually size are used in construction industry for constructing the slab. Photo 3.10 shows the BRC that has been installed on the polythene covering sheet.



Photo 3.10 BRC has been installed by skilled labours.

After installing the BRC on the DPM, the next process was continued with tying the mesh wire on BRC. Photo 3.11 shows the mesh wire was tied by skilled labour by using the reinforcing tying-up hook. This process needs skills to tying the wire on the BRC that has been installed. It is because, the knowledge that get from construction site, the skills of tying the wire on BRC and rebar has their differences technique. Photo 3.12 shows the mesh wire are used in this process before concreting works.



Photo 3.11 Skilled labour tying mesh wire on BRC

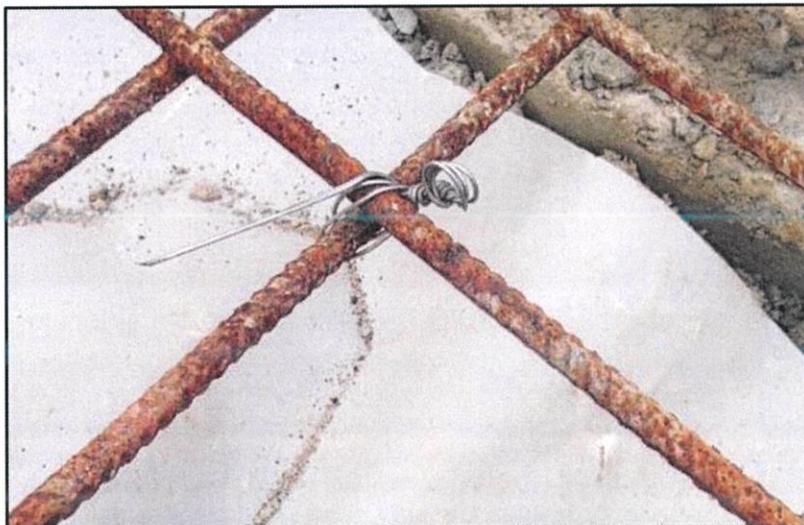


Photo 3.12 Mesh wire was tied on BRC.

8. Pouring the fresh concrete

Pouring the fresh concrete is the large element in this case study to see the slab complete but, it is not the last steps for constructing the ground floor slab at administration building, SAKJ lebai Mohd Yaakob. After the labours tying all the mesh wire on BRC was completed, the next steps to construct ground floor slabs is pouring the fresh concrete.

The grade of concrete that has been used in this process at construction site is Grade 30 and the fresh concrete was ordered from batching plant at Renggam Concrete Sdn. Bhd. Before the mixer lorry pouring the concrete into the concrete bucket, the water was added to the fresh concrete to makes all the mixture bind all together. Photo 3.13 shows that the mixer lorry pouring the fresh concrete into the concrete bucket before mobile crane deliver that concrete to the construction site area that has to be concrete.



Photo 3.13 Fresh concrete was poured into the concrete bucket.

After every equipment has been prepared for concreting works, the fresh concrete that delivered from mixer lorry was poured into the concrete bucket. After that, the concrete bucket which has attached to mobile crane will deliver that concrete to the area that are needed to be concrete for constructing the ground floor slab. The fresh concrete from concrete bucket was poured on the surface that has been installed DPM and BRC and it was not exceeding 50mm for the thickness of fresh concrete for slabs. Photo 3.14 shows a Project Manager conducting the skilled labours to pouring the concrete at required area to be concrete for construct the ground floor slab.



Photo 3.14 Fresh concrete was poured.

There are 7 skilled labours are required for the pouring concrete process of that area. A Project Manager are also required in this works which he conducting during concreting the ground floor slab being build. In constructing the ground floor slab for administration building, there 20 m³ are required to be complete all of area to be concrete by the skilled labours. Every 5 m³ of concrete was carried by one mixer lorry and there are four mixer lorry has arrived at construction site to deliver the fresh concrete.

9. Vibrating the concrete and screed the top surface of the concrete.

After the skilled labours pouring the fresh concrete into the formwork, the fresh concrete was vibrated by using the concrete vibrator using. This process was conducted by a skilled labour to filling air void inside the concrete and makes the concrete that has been filled be more compresses. Photo 3.15 shows the labours vibrating the concrete by using concrete vibrator machine.

Next, after vibrating the concrete process, the concrete was screeded by the skilled labours by using darby float. Screeding the concrete works is an important because it to create the flat and the smooth top surfaces of concrete. The concrete will be screeded from the top to bottom of surface to create the flat surfaces of ground floor slab being built.



Photo 3.15 Skilled labour vibrating the concrete

With screeding the concrete, the surfaces of the top concrete for ground floor slab looked completed and professional looking at this point although this screeding works is not the finishes for the ground floor slab surface.



Photo 3.16 Skilled labour screeding the top of concrete

10. Remove the formwork.

The last steps of constructing the ground floor slab for administration building at SAKJ Lebai Mohd Yaakob is remove the formwork. The formwork has been removed after three days of concreting the ground floor slab works. The skilled labours using the hammer to remove the formwork from the concrete ground floor slab. There are five skilled labour are required in this removing the formwork. Photo 3.17 shows the carpenters removed the formwork for ground floor slab at construction site.



Photo 3.17 Formwork has been removed

3.2 Machineries and equipment

i. Excavator

Excavator is the machine that can excavate the soil of various types forcefully and then using hydraulic system a hydraulic force is generated and utilizing this force bucket is pull back towards the machine. Bucket of excavator is replaceable. If front bucket is exchange with some other attachments then excavator can be used for multi-purpose. Excavator comes in numerous sizes depending on bucket size, length of boom, length of arm, and operation speed.

The types of excavator used on the site in running on site activity are crawler excavator. Crawler excavator usually used to dig trenches, move earth, lift pipe and move large object. In observation in case study, excavator is used to dig the soil and lay the ground surface. A skilled operator is required in controlling this machine properly. Skilled operators need to have high skills and knowledge in handling machines so that any problems about excavation works can be avoided. Photo 3.18 shows crawl excavator are used for soil reclamation.



Photo 3.18 Crawl excavator

ii. Backhoe

Backhoe also among the most important and often used machinery at site during the construction of the ground beam. Those machines are known as multi-purpose heavy construction equipment in construction industry because it can perform in any jobs and backhoe has ability to clean up the construction site. Backhoe loader consist of a digging bucket on the end of a two part articulated arm.

On construction site at SAKJ Lebai Mohd Yaakob, backhoe machine are used for removing tree,clearing out debris, digging the hole and excavate soil. Those heavy machines are very useful and it will make earthwork become easier and faster to do next work at site.

Backhoe loader or known as JCB at construction site are useful for performing various functions. In earthwork such as construct ground beam and ground slab, backhoe is need for make work run smoothly. At this duration, backhoe is required to dig holes, excavate soil and removing excessive land before construct the ground slab work. Photo 3.19 shows a skilled operator use the backhoe loader to fill up the sand into the concrete bucket.



Photo 3.19 Backhoe loader

iii. Mixer Lorry

Mixer lorry is required in constructing the ground floor slab and that lorry will deliver the fresh concrete to the construction site. In this process, there are 20 m³ of concrete are needed to concrete the ground floor slab at administration building, SAKJ Lebai Mohd Yaakob. There are four mixer lorry that deliver the concrete to the construction site and every of them will deliver 5 m³ for each one mixer lorry.

In this concreting works, a Project Manager use Renggam Concrete Sdn Bhd services to deliver the fresh concrete to the construction site from the batching plant which located at Bandar Benut, that far from this project site. Photo 3.20 shows the mixer lorry deliver the fresh concrete on construction site.



Photo 3.20 Mixer lorry

iv. Mobile Crane

Mobile crane also among the indispensable machinery in the work of construct a ground slab at site. The function of this crane is to lift up the heavy object like soil, plywood for formwork, sand and things that relatable with flexibility to move from one place to another place yet can simply supply those object that placed underground to higher places smoothly and provided safety from getting any danger to workers at the site.

In the constructing ground floor slab, mobile crane is used for carry the concrete bucket that filled soil and gravel for backfilling process while concrete slab process this mobile crane will carry the fresh concrete from mixer lorry before pouring it on the ground floor slab being construct. Photo 3.21 shows the mobile crane that used during this project began and it was provided from Warisan Daing Enterprise.



Photo 3.21 Mobile crane

v. Concrete bucket

In process of construct the ground floor slab, the equipment such as a concrete bucket is required and it will be attached with mobile crane. Photo 3.22 shows the concrete bucket was filled fresh concrete from the mixer lorry.

The function of concrete bucket has been used in this process is for help deliver fresh concrete from the mixer lorry to the ground slab area that to be concrete. This equipment also used for deliver the gravel and soil when backfilling work when construct the ground floor slab for administration building at SAKJ Lebai Mohd Yaakob. They have a bottom opening to allow soil, gravel, sand and concrete to flow out from the bucket when in-place.



Photo 3.22 Concrete bucket

vi. Compactor Machine

A compactor is an equipment to reduce or compress the size of material in the construction industry. The compactor is used to compress or compact the soil and make the land suitable for construction purpose. There are several types of compactors used at construction site. Each compactor serves the different purpose.

At the site project of this case study, the contractor used plate vibrator compactor machine to compress the soil and gravel for construction project that require a stable subsurface of ground. This machine is used after soil reclamation works and before anti termed work in construct ground slab. Only provide single skilled labour in this process to compact the soil with properly. The machine is quite heavy and need help from another labour to move from one place to another to continue the same process. Photo 3.23 shows the skilled labour compacting the soil and gravel before spraying the anti-termite process.



Photo 3.23 Plate compactor machine

vii. Concrete vibrator machine

That machinery is used at construction site and the function of this machine is for compress and to ensure that the concrete that has been pour is free from air bubbles. This is so that the concrete remains strong and has smooth surface of the ground floor slab even after removal of the formwork.

In constructing the ground floor slab, the concrete vibrator machine is required in this process. This machine have the additional accessories which called as a needle and this machine will be handled by a skilled labour to vibrating the concrete that has poured on the ground slab being built and the skilled worker will make sure that vibrating concrete work will be smoother and neat without any problems will occurs. Photo 3.24 shows the examples types of concrete vibrator machine that are used at construction site.



Photo 3.24 Concrete vibrator machine

viii. Reinforcing bar tying-up hook

Reinforcing bar tying-up hook is the requirement that used for tie the wire on BRC that has been installed on ground floor slab being built. Photo 3.25 shows the tying-up hook that are used by skilled labours to tying wire mesh on BRC or reinforcing bars.



Photo 3.25 Tying-up hook

ix. BRC

The BRC is the important component that involved in constructing the ground floor slab and not only for ground floor slab, but it also needed in constructing 1st floor slab and 2nd floor slab at that construction site. The size that has been used at construction site is 120mm x 120mm square BRC. Photo 3.26 shows the example of BRC that has been installed and used at construction site.



Photo 3.26 BRC has been used at construction site

x. Damp Proof Membrane (DPM)

In construction of ground floor slab the damp proof membrane (DPM) also the important element compare than other level. As 1st floor and 2nd floor slab, they are not require to use the DPM. For construct the ground floor slab, DPM is require because it function is to prevent the transference of water and water vapour through the foundation into the building.

The types of DPM that used in construction site are from Polythene material. Photo 3.27 shows the polythene covering sheet placed on the ground by the skilled labours as the DPM.



Photo 3.27 Polythene covering sheet as DPM

3.3 The advantages and disadvantages construction of concrete ground slab in construction industry.

3.3.1 Advantages of concrete ground floor slab

i. Economical

Cost is the important element for build the building or any types of structures. The construction industries in Malaysia also provide the various types the construction of floor slab. In this case study, this construction site which construct the school of SAKJ Lebai Mohd Yaakob chosen by the client to construct the concrete floor slab for this project.

The concrete floor slab has chosen because the cost of material and construction wages for the labour are quite cheaper than other types of flooring material such as ceramic tiles, natural stone or timber flooring. Besides, cost of material that are used in construct the concrete floor slab easy to get from building material manufacturers.

ii. Durable

Concrete floor slab also has chosen in this project because it was suitable with this type building which is educational building that need always used for publics. In additional, that ground floor slab level of building is administration area that placed as teacher room that need many of furniture. The concrete floor is durable because it can stand with any heavy furniture, high temperature or the risk of scratches on its surface.

iii. Variety of design

Concrete ground floor slab can get from any variety of deign that can request from the client. Compare to others types of material, concrete ground floor slab, can get in variety of design because the method in construction of it is quite easy compare to others type of material.

3.3.2 The disadvantages of concrete ground floor slab

Although there are have the advantages of constructing the ground floor slab, but it also have their own weakness and disadvantages of it.

i. Hardness

The hardness of the concrete floor slab can be the disadvantages because it involving the safety issue. If any of glass or other delicate material accidently drop of it, that material will be easy to crack or broke on the surface of concrete floor slab.

ii. Comfort

In construction industry, concrete floor slab can't give the good comfort to people. Not every people like the cold environment. Sometimes, they are more prefer to be in warm environment. From of that, the people who use the concrete floor slab in their building, but don't like with cold environment, they need to install the covering of floor with rugs or carpet.

iii. Moisture

The geographical of the construction site in this case study, the building SAKJ Lebai Mohd Yaakob being build are located at nearest moisture place. Those buildings are located at behind of creeks.

The uses of concrete ground floor slab that has been construct, concrete ground floor can get damage easily by dampness seeping through the below of the ground. This can affect the stain or coating on the surface.

CHAPTER 4.0

CONCLUSION

4.1 Conclusion

Based on the study that has been done during 14 weeks practical training at SAKJ Lebai Mohd Yaakob, Ayer Baloi, Pontian, the construction method of ground floor slab were discovered.

The important of ground floor slab in educational building such as schools is to be a strong foundation slab that carry significant building column and wall loads. During practical training, there are various types of slabs van be identified besides can learn how to construct the ground floor slab with true procedure and method at construction site. The true mixture of concrete that are required in construction industry before pour it to be a ground floor slab has been identify.

Project in construction site was delays until 3 month from the date should be construct the building in contract. However, these problems overcome with successfully by this company. In conclusion, the construction method of ground floor slab can be determined.

REFERENCES

Books:

1. Marshall D, Worthing D, Health R, and Dann N (2014) “Understanding Housing Defects”. 4ed, New York: Routledge
2. Wass A and Sanders G A (1981) “Material and Procedures for Residential Construction’ Reston Publishing Company
3. Riley M and Cotgrave A (2013) “ Construction Technology 1: House Construction “ 3RD. London: Palgrave Macmillan

Web site :

1. Wikipedia (2018). Available from : <http://en..wikipedia.org/wiki/Floorslab>
2. Designing building (2018). Available from: <http://www.designbuildings.com>
3. Concrete Slab. Available from: <http://www.civiltoday.com>