DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

CONSTRUCTION PROCESS OF SUPERSTRUCTURES FOR A SINGLE STOREY HOUSE

Prepared by:

SARAH NADHIRAH BINTI NIZE

2017207038

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

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DECEMBER 2019

It is recommended that this practical training report provided

by

Sarah Nadhirah Binti Nize

2017207038

entitled

Construction Process of Superstructures

For A Single Storey House

accepted in partial fulfillment 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.

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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 MRM Dinamik Resources for duration of 20 weeks starting from 5 August 2019 and ended on 20 December 2019. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

Name : SARAH NADHIRAH BT NIZE

UiTM ID No : 2017207038

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ACKNOWLEDGEMENT

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

I would like to express my deepest appreciation to all those who have give me guidance, advice and help throughout the training period. First of all, a special gratitude I give to En. Rusdi bin Mamat for giving the opportunity to conduct my training in his company which is MRM Dinamik Resources. It is a great chance for me to learn and develop my understanding and knowledge in the construction field and feel of real time projects. Therefore, it is an honour and I was lucky to be provided with the opportunity to be in the company.

Next, I would like to thank the lecturers who are directly involved during my training especially Dr. Asmat Binti Ismail as my supervising lecturer for the encouragement and ideas that have given for me to complete this report. I would also like to thank En. Muhammad Naim bin Mahyuddin as the Practical Training Coordinator and Dr. Dzulkarnaen bin Ismail as Programme Coordinator for the time and effort that they have contributed towards the successful completion of my training.

Last but not least, my special thanks to my friends which have directly and indirectly guided me in writing this report and my beloved parents for their sacrifices over the years.

ABSTRACT

Superstructure is the structure that was built above ground level that receives load from other masonry structures and transfer the load to the substructure and then to the ground. The aim of this study is to investigate the construction process of the superstructure for a single storey house. Data for this study was collected through on-site observation, interviews and document review. It was found that conventional method has been used for the construction process of the superstructures. The process of the construction was started by constructing the ground beam following the slab and then column and it has been construct thoroughly. This can conclude that superstructures are important element in securing the strength and durability of a building.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

This study was carried out at Kuala Berang, Hulu Terengganu, Terengganu. The project chosen is titled "Cadangan Membina 1 Unit Rumah Banglo (1) Satu Tingkat Jenis Kekal Di Atas Lot 5483 (GM 1475), Sungai Petai, Mukim Kuala Berang, Daerah Hulu Terengganu, Terengganu Darul Iman. This project is chosen as the main subject of the study because the datas of the building can be access easily. From the datas collected, the sequences of method installation of the superstructures are studied.

Superstructure is the building parts located above the ground level such as column, beam, slab and roof. Materials used to construct the superstructures are either timber, steel or reinforced concrete. Reinforced concrete is the common materials used for the superctructures which it is also used in this project.

The strength and the durability of a building depend on how well the superstructures are construct. The superstructures need to be firm and strong enough to endure the live load, wind load or load from the other structures. Thus, it is important to make sure that the superstructures of a building are well construct and durable.

1.2 Objectives of The Study

i. To investigate the process of constructing the superstructures
ii. To determine the problems occured during the construction process and solutions taken to solve the problems

1.3 Scope of Study

This study is focusing on the construction of the superstructures which consists of beam, slab and column and the problems occur during the construction also the solution taken.

1.4 Limitation of Study

In this report, the construction process of roof structures was not studied because the project is still ongoing.

1.5 Research Methods

This research is carried out by three methods which are by observation, interview and document reviews. The resource and research method were helped by the supervisor to share the information related to the case study. The flow of this research method started by observation on site, interview session then lastly continues with reviewing some documents.

1. Observation

Observation is made at the site location. From this method, the construction process of the superstructures on site can be seen clearly. The observation is made as long as the project is running. The observation is recorded by writing notes, taking pictures and videos.

2. Interviews

Along the observation, interviews have been done with the supervisor and the labourers on site to understand more about the topic. The interview session has been taken place at the site location. During the session, the supervisor explains generally about superstructure and the construction process on site. From his explanations about the study, some short notes and data were taken to help the study.

3. Document reviews

The data for the study is obtained by referring some documents such as company profile, construction drawings and project files. The documents were obtained with the permission from the supervisor.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of The Company

MRM Dinamik Resources (MRM) is a private company that was incorporated in september 2009 under the companies act 1965. The company comprised of energetic and resourceful minds, which provide services in nature of property development and construction activity. The MRM is headed by Encik Mohd Rusdi B. Mamat (Manager) that have almost twelve (12) years experience in construction and project development.

MRM has a broad base of expertise, experience and beyond its tender year. Within a short span of time, MRM have built a competitive niche for the company as "one stop resourcing centre" for design and build of dream home. From designing to handing over, closed bond with client enables MRM to fulfill every project or development within timeframe

MRM is specializing in project management, general contractor, home designer (architectural and structure) and 3D Graphic. Range of services that are offered by MRM includes:

a) Project Development

Property development broad range consists of:

i. Housing development – mix development (bungalows, semi detached, terrace)
ii. Commercial building
iii. Industrial building

b) Home Designer

This include spectrum of:

i. Architectural design
ii. Structural design
iii. 3D home graphic & modeling

c) Construction Activities

Services broad range of civil works includes:

i. Utility & infrastructure works
ii. Road construction
iii. Earth works
iv. Water treatment works,
v. Sewerage works
vi. Foundation works,
vii. Landscaping,
viii. Compound fencing
ix. Other civil works

d) Project Management

Project Management requires strategic analytical skills necessary to visualize beyond the technical demands of the project and view the end results of a project in terms of generated business value.

e) Maintenance & Services

Maintenance services range from maintenance of facilities, buildings and also industrial equipment. It is our objective to give the best services in every aspect of our services.

2.1.1 Location of The Company

MRM Dinamik Resources is located at Gong Kapas, Jalan Sultan Mohamad, Kuala Terengganu, Terengganu. Figure 2.1 shows the location plan of the company viewed from the google map.

Figure 2.1: Location of MRM Dinamik Resources Office
Source: Google Maps

2.2 Company Profile

Table 2.1: Company Profile

INFO	CONTENT
Company Registration Name	MRM Dinamik Resources
Manager	Mohd Rusdi bin Mamat
Logo	
Registered Address	485-A, Tingkat Atas, Gong Kapas, Jalan Sultan Mohamad, 2110 Kuala Terengganu, Terengganu, MALAYSIA
Telephone No.	
Fax No.	
Company Registration No.	TR 0091346 X
Date Incorporated	16 September 2009
E-mail	rusdi.mrmdr@gmail.com
CIDB Registration No.	0120131001-TR152264
Company Shareholders	1. Mohd Rusdi bin Mamat (I.C No.:) 2. Nor Farlina binti Hasan (I.C No.:)

Bankers	MAYBANK ISLAMIC Kuala Terengganu, Terengganu Ground Floor, Menara Yayasan Islam Terengganu Jalan Sultan Omar, 20300 Kuala Terengganu Terengganu Darul Iman Telephone: Facsimile: (Account No.: 0542 1100 4090 4) PUBLIC ISLAMIC BANK Kuala Terengganu, Terengganu 1849, Bangunan Wisma Maju, Jalan Sultan Ismail, 20200 Kuala Terengganu, Terengganu. Tel: / / (Account No.: 3810077436)

2.3 Organization Chart

Figure 2.2: Company Organization Chart

2.4 List of Project

2.4.1 List of Complete Project

Table 2.2: List of Complete Project

NO.	PROJECT TITLE	CLIENT	PROJECT VALUE (RM)	CONTRACT PERIOD
1.	Cadangan Membina dan Menyiapkan Satu Unit Banglo Dua (2) Tingkat Jenis Kekal di atas 21760, GM 15128, Mukim Batu Rakit, Kuala Terengganu, Terengganu	Muhamad Kamal b. Ahmad	420,000.00	June 2014 - April 2015
2.	Merekabentuk, Membina dan Menyiapkan Sebuah (1) Banglo Satu (1) Tingkat di atas Lot PT1136, (HSM 983), Mukim Paloh, Kuala Terengganu, Terengganu	Pn. Nur Hanisah bt. A.Rahman @ Yusof	350,000.00	October 2014 - April 2015
3.	Merekabentuk, Membina dan Menyiapkan Sebuah (1) Banglo Dua (2) Tingkat di atas Lot 16206, (GM11323), Mukim Batu Rakit, Kuala Nerus, Terengganu	En.Saharjuna Mustapha	455,000.00	Mac 2016 - January 2017
4.	Cadangan Merekabentuk, Membina Dan Menyiapkan Sebuah Banglo Satu (1) Tingkat Jenis Kekal Di Atas Lot 30408 (GM 20968), Tok Jembal, Mukim Kuala Nerus, Kuala Terengganu, Terengganu	En. Nordin b. Mohamad	300,000.00	July 2018 - November 2019

5.	Cadangan Kerja-Kerja Baikpulih Dan Ubahsuai Bangunan Pejabat Dua (2) Tingkat Serta Membekal Perabot Pejabat Di Tapak Kilang PERMINT PLYWOOD SDN. BHD., Kawasan Perindustrian Bandar Al Muktafi Billah Shah, Dungun, Terengganu Darul Iman	PERMINT PLYWOOD SDN. BHD.	211,000.00	Mac 2019 - July 2019

2.4.2 List of On-going Project

Table 2.3: List of On-going Project

NO.	PROJECT TITLE	CLIENT	PROJECT VALUE (RM)	STARTED DATE
1.	Cadangan Membina Satu Unit Rumah Banglo Satu (1) Tingkat Jenis Kekal di atas Lot 5483, GM 1475, Sungai Petai, Mukim Kuala Berang, Daerah Hulu Terengganu, Terengganu	Wan Kuntom bt. Wan Muda	200,000.00	August 2019
2.	Cadangan Membina Satu (1) Unit Rumah Kekal Dua (2) Tingkat, GM 10913, Lot 13001, Mukim Sura, Daerah Dungun, Terengganu	Rosnida bt Mohd Nor	580,000.00	February 2019

CHAPTER 3.0

THE CONSTRUCTION PROCESS OF SUPERSTRUCTURES FOR A SINGLE STOREY HOUSE

3.1 Introduction to Case Study

This study is about the construction of a single storey house in Kuala Berang, Hulu Terengganu, Terengganu. The project is a single storey house on a private land that consist of 4 unit rooms and 3 unit bathrooms with an area of 151 sqm (1625 sqft). The estimated value of this project is around RM 200,000. It is an ongoing project that started on 16 August 2019 and it is estimated to finish around March 2020. The project is situated in a rural area which is surrounded by rows of houses. It is also located near schools which make it a good location to build a house. Figure 3.1 shows the location plan of the project on google map.

Throughout the observations, every stages of the house construction process can be seen clearly. This study is focus on the process and methods that involved during the construction of superstructures from ground beam, slab then column only.

Figure 3.1: Location of The Project
Source: Google Map

3.2 Construction Process of Superstructure

3.2.1 Ground Beam

Beam is a structural member that carries load which spans horizontally between supports. Construction of beam is including formwork installation, reinforcement installation, concrete pouring and formwork removal. The dimension of the beam is based on the measurement on the drawing plan as in Appendix A.

Table 3.1: Schedule of Ground Beam Dimension

MARK	DIMENSIONS (mm)			MARK	DIMENSIONS (mm)		
	WIDTH	LENGTH	HEIGHT		WIDTH	LENGTH	HEIGHT
GB 1	125	8300	700	GB 11	125	4800	700/650
GB2	125	2300	450	GB 11A	125	3300	700
GB 3	125	4500	450	GB 11B	125	1350	650
GB 3A	125	3800	450	GB 11C	125	3300	700
GB 3B	125	1200	600	GB 11D	125	3000	700
GB 4	125	2300	450	GB 12	125	1350	450
GB 5	125	5000	450	GB 13	125	1350	450
GB 5A	125	1200	600	GB 14	125	10950	450
GB 6	125	1000	450	GB 15	125	4800	450
GB 7	125	2300	450	GB 16	125	1950	650
GB 8	125	3300	450	GB 17	125	13800	700
GB 9	125	5000	450/700	GB 18	125	3300	600
GB 10	125	4500	700/650				

i. Installation of Formwork

After the location of ground beam was determined and marked correctly, formwork was installed. Materials used for the formwork in this project are timber and plywood because it is easy to handle and remove. The plywood was cut based on the dimension from the drawing plan (Appendix A) before it was placed at it position. The formwork parts and connections was arranged in a way that makes formwork removal easy and simple to prevents damage to concrete and formwork panels so that it can be reused without extensive repair. Stakes were fixed on the sides of the formworks using nails to hold the form in place. Figure 3.2 shows installation of formwork for the ground beam.

Figure 3.2: Formwork Installation for Ground Beam

The formwork was strut properly and free from gap with no opening at joints to avoid concrete leakage during concreting work. The inner surface of the formwork was applied with oils to make it easier to remove the formwork later after the concrete is hardened. The installation of formwork for the ground beam took two days with three labours. Figure 3.3 shows the top view of the site project during the installation of formwork.

Figure 3.3: Top View of The Site During Formwork Installation

ii. Installation of Reinforcement Bar

The type and size of the main bar used for the reinforcement of the beam was Y10 with 10 mm diameter and type R6 with 6 mm diameter for the link. In each ground beam, four main bars were used and links were tied to the main bar with spacing 200 mm center to center using steel wire. Size of the links is based on the dimensions of the ground beam minus the concrete cover. This work requires five or six workers at a time. Lean con was laid as 25 mm before placing the reinforcement bar into the formwork. The steel design can be seen in the steel plan as in appendix B.

All reinforcement was fastened and was checked before installing into the formwork. It was ensured that it was fixed accurately and securely in position so that the reinforcement is in the correct position in relation to the formwork. This is to give the specified concrete cover which is 25 mm and will not be displaced due to the placing and compaction of the concrete or any related operations.

iii. Concreting Work for Ground Beam

Concrete was poured into the formwork after finish installing the reinforcement. The concrete was manually mixed with 1:2:4 ratios using the concrete mixer. Concrete was carefully transferred and poured into the formwork using the wheelbarrow. Figure 3.4 shows the concrete is poured into formwork.

Figure 3.4: Concrete Pouring for Ground Beam

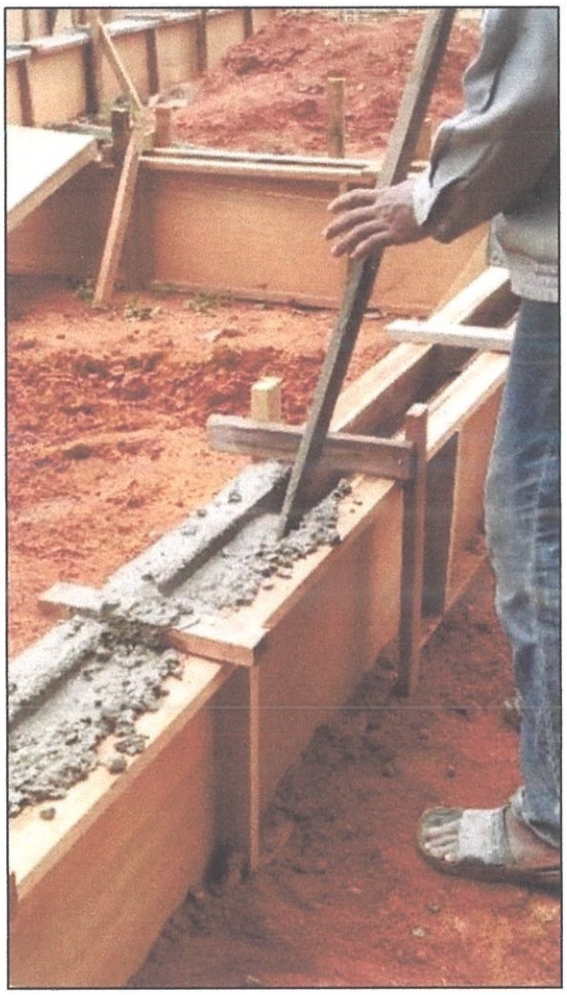

Figure 3.5: Concrete is Compacted

Then, the concrete was thoroughly compacted as shows in Figure 3.5 during the placing to ensure that it was completely surrounds the reinforcement and fills the formwork. Poor compaction of concrete can cause permeability issue which will make the steel corrosion and decrease the capability of the hardened concrete. Entrapped air was eliminated out of the concrete by knocking on the sides of the formworks and tool like finishing trowel was used to give a smooth surface of the beam. The concreting works for the ground beam take three days with four labours to complete. Figure 3.6 shows concrete is flattened on the surfaces using the trowel.

Figure 3.6: Concrete is Flattened on the Surface

iv. Removal of Formwork

The formworks were removed after the concrete were completely harden. Hammer was used to remove nails from the stakes holding the forms in place. The formwork panels were pulled away from the sides of the concrete ground beam using as little force as necessary. It was removed carefully so it will not physically damage the structural member and the formwork panels by using wooden wedges. The formwork panels were cleaned and it was reused to construct the remaining ground beam.

3.2.2 Floor Slab

Concrete floor slab includes sand filling, anti-termite, plastic cover installment, placement of wiremesh and concrete pouring. It only took two days with four or five labours to completely construct the slab concrete which a day for concreting work and another day for curing process.

i. Sand filling, Anti-Termite Treatment and Plastic Barrier

The first layer of a slab was filled with sand. The sand was spread evenly at the base of the slab with thickness 150 mm. River sand was used to provide uniformity for the slab. Backhoe was used to transport and placed the sand as shown in Figure 3.7 which was handle by a skilled labour. The sand was spread evenly using tools such as shovel. This work was done by three to four workers.

Figure 3.7: Sand Filling in The Slab Area

The sand needs to be compacted properly to prevent the concrete slab drops down. Even a small sensible amount of vibration on the earth can cause the sand to settle down and will make the structure unstable or collapse. A poorly compacted soil under a slab will end up with a hollow spot. When pressure is applied to it, the concrete will bend or stretch to fit in the hollow spot and will end up with cracks and the concrete slab drops down.

Anti termite treatment was applied after the sand was filled. The purpose of this treatment is to provide the building with a chemical barrier between the ground slab and masonry that will prevent the insects to approach the building. Without this treatment, the insect will enter the building and cause damage to the framework inside and outside of the building.

After the treatment, the sand was covered with plastic barrier before installing the wiremesh. Plastic barrier is a way to prevent the water in the concrete mix from getting into the sand layer as it can affect the water cement ratio in the concrete mix. When the water ratio is too much or too little, there will greater shrinkage with the possibility for more cracks and reduced compressive strength of the concrete. So, water ratio in the concrete mix should be at right amount to ensure that the concrete is strong enough to bear the load from the structures. This is why a plastic barrier under concrete was used for the slab. Figure 3.8 shows plastic barrier installed under the wiremesh.

Figure 3.8: Plastic Barrier Installed Under Wiremesh

ii. Installation of Wiremesh

Before placing the wiremesh, concrete spacing blocks with the same height was spread throughout the slab area to ensure that the mesh was held in the center of the slab without moving as the concrete was poured. Then, wiremesh was placed on the spacing blocks. Wiremesh was used in the construction of slab to prevent cracks that form in the slab from spreading throughout the material and causing possible breakage. The wiremesh was placed overlapping one foot along the edges and it was tied together at the overlap using steel wire. It was arranged so that the wiremesh covered the entire slab area. This project used wiremesh type square mesh 8A that is 8 mm diameter of main wire with 200 mm spacing center to center. Figure 3.9 and Figure 3.10 shows the wiremesh were installed and the overlapped between wiremesh.

Figure 3.9: Wiremesh Installation

Figure 3.10: Overlapped Wiremesh

iii. Concreting Work

Concrete was poured and spread after finish installing the wiremesh. Ready mixed concrete was used for the slab which was poured from the concrete truck as it is time saving and save the energy of the labours. In order to avoid segregation of the concrete, it was poured as close as possible to the slab area. Figure 3.11 shows the concrete pouring for the slab.

Figure 3.11: Concrete Pouring for Slab

While the concrete was being poured, the concrete was spread evenly and was compacted on the slab area by three labours using tools like shovel, wheelbarrow and screed to give a good surface appearance of the slab. Figure 3.12 shows concrete spreading work on slab area. The concreting work take half of the day to completely finish. After concreting work finished, the slab was left for a day for the concrete to cure. The next work cannot be continued as long as the slab was not completely hardening. Figure 3.13 shows the slab were left for the curing process of the concrete.

Figure 3.12: Concrete Spreading

Figure 3.13: Curing Process of Concrete

3.2.3 Column

Column is a vertical member carrying the beam and floor loadings to the foundation and is a compression member. The construction process starts with the installation of reinforcement, installation of formwork, concreting work and end with the removal of the formwork. For this project, it has 24 total number of columns that are 10-inch x 10-inch in size.

i. Column Layout Work

Before constructing the columns, the location of columns was decided based on pad foundation plan as in Appendix C. It was done by laying rope as per grid. Then, the location of the columns was marked.

ii. Installation of Reinforcement Bar

Each column has four numbers of 10 mm diameter bars as the main bar and 6 mm diameter steel that be placed 100 mm center to center spacing as the stirrups. The stirrups were tied to the vertical bar using steel wires. Type of main bar used was Y10 and R6 for the stirrup. Details of every column can be seen in column reinforcement shedule in Appendix D. The minimum lap length for column steel is 40 mm diameter. The size of the columns reinforcement bar is 10-inch x 10-inch with concrete cover 25 mm thickness. Figure 3.14 shows the stirrups were fixed the with the main bar.

Figure 3.14: Fixing Reinforcement Bar

After the reinforcement was assembled, it was accurately fixed in the required position. It was tied to the starter bar vertically using steel wires to make sure that the reinforcement can stand firmly. It was also make sure that it was straight upright to give the specified concrete cover. Minimum concrete cover for column reinforcement is as per the details drawing which is 25 mm. All reinforcement was fastened before concrete was placed and secured against displacement. Figure 3.15 shows reinforcement bar installation.

Figure 3.15: Reinfocement Bar Installation

iii. Installation of Formwork

Formwork for column was firstly assembled with the first three panels of formwork. The panels were joined together using nail 75 mm length. Oil was applied at the inner surfaces of the formworks to make formwork removal easy without cause any damage to the concrete or formwork panels. Then, the formworks were installed at it place which is around the column reinforcement bar. Figure 3.16 shows assembling work of formwork for column.

Figure 3.16: Assembling Work of Formworks

Afterwards, the last panel of the formwork was joined to the rest after applying some oils at the inner surfaces. It was securely braced, supported and wedged to retain its position without displacement or deflection during the placing and compaction of concrete. Stakes were also fixed on the sides of the formworks to hold the form in place. The formwork was checked that it was free from gap to prevent any leakage of concrete during the concrete pouring. It was also make sure the column formworks were stand upright.

iv. Concreting Work

The concreting work for column was done manually. The concrete was mixed with 1:2:4 ratios using the concrete mixer. Then, the concrete was carried in the bucket and was poured manually into the column formworks from the top. Since the column was 10 feet height, the labours climbed up on the scaffold to pour the concrete from the top of the formworks. The sides of formworks were knocked to eliminate the entrapped air out from concrete. The column was left for one day to let the concrete to harden. This work is done by five general labours. Figure 3.17 shows the concrete was poured from the top into the column formwork.

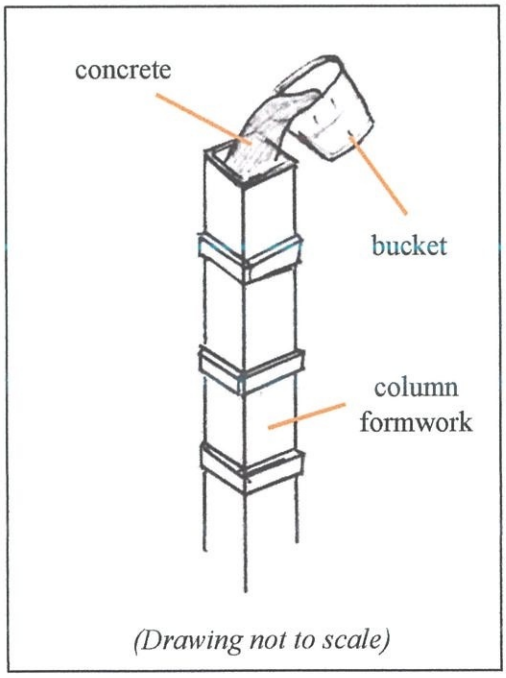

Figure 3.17: Concrete Pouring for Column

v. Stripping Off Formwork

The process of stripping off formworks for the column is similar as removing formworks at the ground beam. The formworks were removed after the concrete were completely cured. The nails were removed carefully from the formworks using hammer. The formwork panels were pulled away from the sides of the concrete column carefully.

The process of formwork removal was done thoroughly to not to cause any damage to the concrete or the formworks itself. The formwork panels were cleaned to be reused to construct the remaining column. Figure 3.18 shows the concrete column after removing the formwork.

Figure 3.18: Column After Removing The Formwork

3.3 Problem Occurred During The Construction Process and Solution

3.3.1. Honeycomb on The Structures

Honeycomb was found in the column because of the rain. During the concreting process of columns, it was raining and the water to cement ratio of the concrete paste were high which lead to excessive bleeding. The bleed water rises and remain trapped under aggregates and reinforcing which increase the capillary porosity and effect the density and durability of the concrete. This also happened because the concrete was not compacted properly. The small space of the formwork makes it difficult to compact the concrete. The figure 3.19 shows a spot of honeycomb happened.

Figure 3.19: Honeycomb on Column

3.3.2. Reinforcement Bar Not Tied Securely

Before connecting the reinforcement bar to the starter bar for the column, the reinforcement bar was inspected. It was found that the stirrups were not fixed securely to each main bar. It was tied in the wrong way and causes the knot to lose and make the distance between each stirrups were not the same. This will make it hard to install the reinforcement bar and the reinforcement will be displaced during the placing and compaction of concrete. Moreover, it will affect the strength of the column if it is continued to install it.

3.3.3. Miscommunication Between Contractor and Subcontractor

During the project period, there was a few miscommunication has happened between the contractor and the subcontractor. The labours were busy finishing their work at another site and did not come to work at this site project. This has caused the project to be delayed for three weeks due to the absence of the labours at site. Figure 3.20 shows the site conditon throughout the delays.

Figure 3.20: Site Condition Throughout The Delays

3.4 Solution Undertaken to Cater The Problems

3.3.1. Solution to Honeycomb on The Structures

The honeycomb was fixed by simply fill the void with concrete paste. The void was overfilled slightly. After the concrete paste has slightly harden, the excess concrete was trimmed off to give a smooth surface appearance.

3.3.2. Solution to Reinforcement Bar Not Tied Securely

The loose knot was removed and the position of the stirrup was fixed. Then, the stirrups were tied securely to the main bar using steel wires. The reinforcement bar was checked for the last before attaching it to the starter bar for the column. Figure 3.21 shows the labour was fixing reinforcement bar for column.

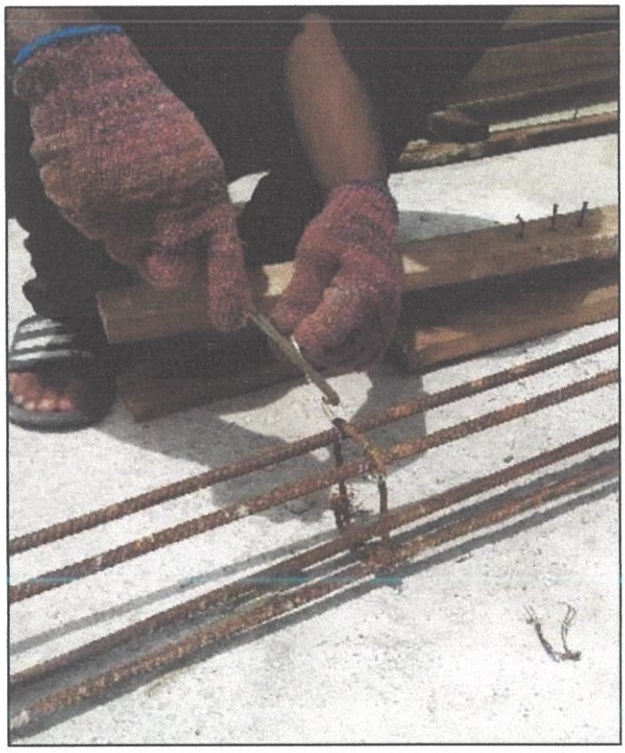

Figure 3.21: Fixing Reinforcement Bar for Column

3.3.3. Solution to The Miscommunication Problem

The contractor ended the contract with the subcontractor and hire new subcontractor. After the changed of the subcontractor, the work at site was continued running as scheduled.

CHAPTER 4.0

CONCLUSION

As a conclusion, the method used for the construction process of the superstructure are the conventional method. Nevertheless, the construction process has been done thoroughly to ensure the durability and the stability of the structure to bear load from the masonry structures. It can be seen that the strength of a building is depend on how well the superstructures are built.

Apart from that, some problems are discovered during the construction process such as honeycomb on the structures, reinforcement are not securely tied and the miscommunication between the contractor and the subcontractor. It is identified that problems happened is due to weathering and mistakes by the labours. However, problems occurred throughout this project does not adversely affect the project and it is easily resolved. The project still manages to keep under control and back on track as scheduled. Despite that, contractors still need to monitor works at site regularly to ensure the works at site are running smoothly.

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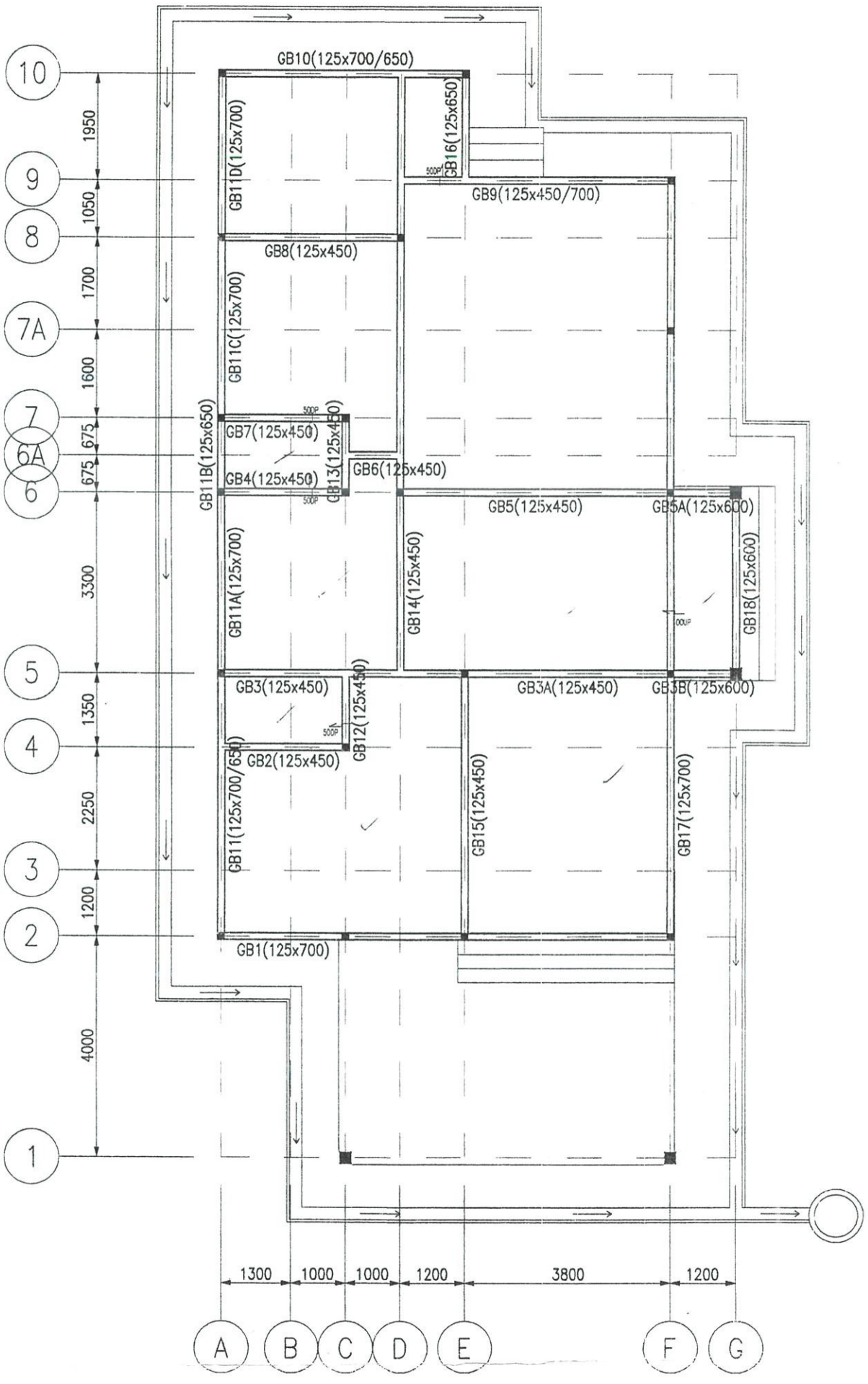
APPENDIX

APPENDIX A

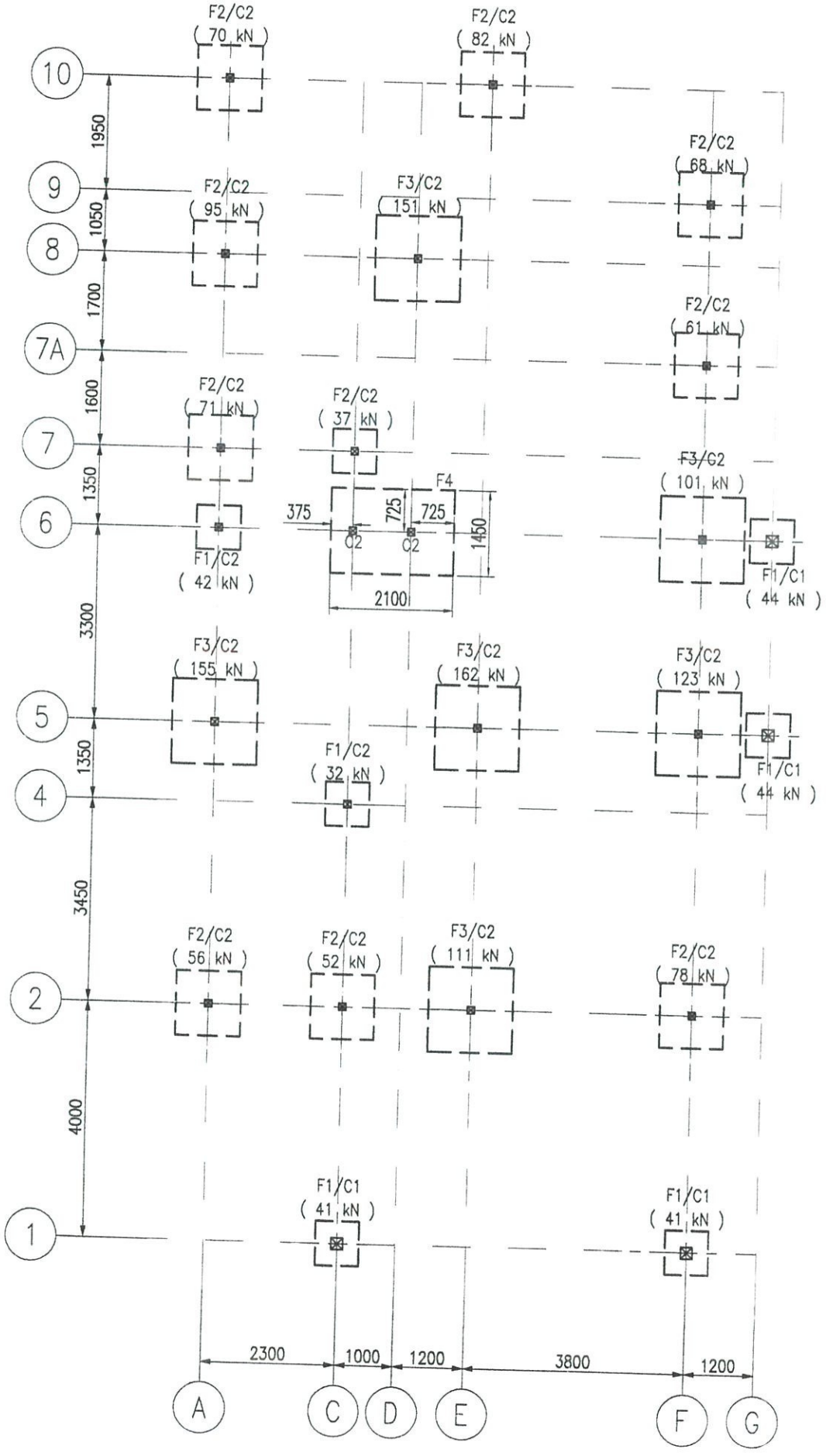


GROUND BEAM LAYOUT

SCALE 1:100

APPENDIX B

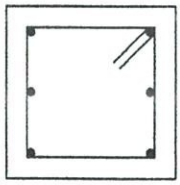
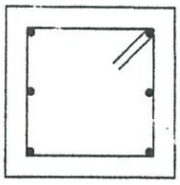
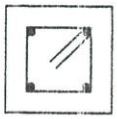
APPENDIX C



PAD FOUNDATION LAYOUT

SCALE 1:100

APPENDIX D

FLOOR \ COLUMN MARK		C1	C2
Floor GB–RB			
	MAIN BAR	6Y10	4Y10
	TIES	R6–100	R6–100
	COL. SIZE	200 X 200	125 X 125
Stump			
	MAIN BAR	6Y10	4Y10
	TIES	R6–100	R6–100
	COL. SIZE	200 X 200	125 X 125

COLUMN REINFORCEMENT SCHEDULE