DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

SUPERSTRUCTURES WORK OF HOUSING

Prepared by:

MOHAMAD NURFAKHRUL AZIZI BIN MOHD ZALANI

2017206438

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING, AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

DECEMBER 2019

It is recommended that the report of this practical training provided

by

MOHAMAD NURFAKHRUL AZIZI BIN MOHD ZALANI

2017206438

Entitled

SUPERSTRUCTURES WORK OF HOUSING

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

Report Supervisor	:	Dr. Azamuddin Bin Husin
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)

DECEMBER 2019

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 Capaian Setia Sdn Bhd for a 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 partial fulfillment of the requirements for obtaining the Diploma in Building.

.....

NAME : MOHAMAD NURFAKHRUL AZIZI BIN MOHD ZALANI

UiTM ID NO : 2017206438

DATE : 12 DECEMBER 2019

ACKNOWLEDGEMENT

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

I would like to extend my heartfelt gratitude for the guidance, advice, and help rendered throughout the period of training by the following group of amazing individuals. First and foremost, I would like to thank Mr Danny for the opportunity given, to conduct my training in his esteem company. His team of professionals comprising of Mrs Hasmi Sulaiman and Mr Roslan Rafie, have enabled me to learn and develop my understanding, knowledge and feel of real-time projects, and the theory involved in analysis of structures, building and civil works. They are also responsible for streamlining and assessing my training. Also, to the site personnel Sunset Villa Sdn. Bhd. who have extended their cooperation and help to further enhance my ability in understanding the procedures in construction and site administration, test procedures, site safety and best practices in the industry. It is an honor for me to be given the opportunity to 'work' with all of you.

I would also like to thank ALL the UiTM lecturers that have taught and nurtured me in becoming a better student and person. I would also like to extend my deepest appreciation to the lecturers who are directly involved during my training stint. To Dr. Azamuddin Bin Husin, Supervising Lecturer, who has given me advice to complete this report. Puan Noor Sahidah Binti Samsudin, Visiting Lecture, En Muhammad Naim bin Mahyuddin, Practical Training Coordinator and Dr. Dzulkarnaen bin Ismail, Programme Coordinator, I value the time, effort, encouragement and ideas that they contributed towards the successful completion of my training, this report and the valuable knowledge that have been shared over the last few semesters.

Finally, my special thanks to my beloved parents for their sacrifices over the years.

Thank you so much.

ABSTRACT

Guideline for construction of superstructure is a very important thing to know and elaborate, therefore this report will discuss the process of construction superstructure and problem faced to ensure the quality and specification acceptable in construction industry. The main purpose of this case study was to understand the method and process for superstructure construction in the housing construction projects. Other than that, to identify the elements required in the superstructure construction process. In result, the procedure has obtained and identified the problems and solutions of the project without any problem. Finally, all the information needed has been obtained to complete the case study.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

Superstructure in construction are the part of the structural system which is above the ground level. It commonly includes column above ground level, slabs and beam, bridge deck, pier above ground, trusses. A superstructure is an upward extension of an existing structure above a baseline called Ground Level in general and it usually serves the purpose of the structure's intended use. In Buildings, the portion of the structure that is above ground level that receives the live load is referred to as Superstructure. The superstructure of a building is the part that is entirely above its foundation or basement (Tamiri, P, 2016).

The case study was located at Taman Kerian Putra, Parit Buntar, Perak. This study was focusing on developing of the superstructure construction from the beginning until the end of the process. This study was highlight on the method process for concreting superstructure in the housing construction projects and describe the elements and things to be considered in superstructure for housing construction projects. A part from the superstructure studies, there are several problems encounter during the construction process that need to be handled well.

Figure 1.1 Location Plan of Project Site Taman Kerian Putra

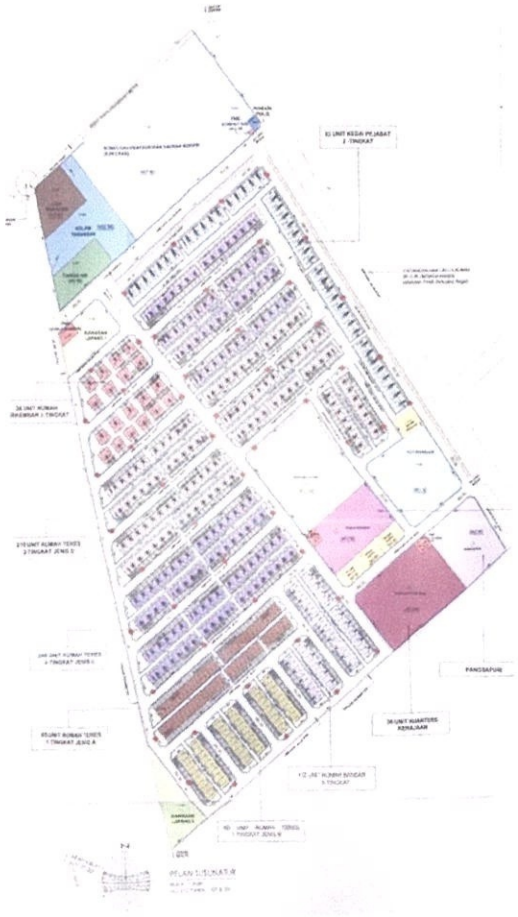


Figure 1.2 Plan of Project Site (Source: ALM Architects)

1.2 Objectives

The aim is to study systems of how to ensure good workmanship quality of a building construction works. Based on the aim and practical training session, the following are the objectives of this study:

1. To understand the method and process for superstructure construction in the housing construction projects.
2. To identify the elements required in the superstructure construction process.
3. To identify problems and solution related to the construction of superstructure.

1.3 Methods of Study

This method have been used to complete this report is as shown below:

1. **Interview**

   The interview method is one of the ways to obtain primary data. Therefore, in order to obtain primary information, face-to-face interviews were employed. Interviews with Site Manager, Site Supervisor, Quality Control Engineer and Developer about how the process for construction of superstructures and identifying defect of building.

2. **Observation**

   Observation method is the most frequent method use as it have been done throughout the whole practical training directly by daily site visit for the whole period. The information collected are based on all the activities occurred at site construction with guidance by site supervisors. All the information are collected using mobile device by taking photos and recording videos of site activities such as work progress, equipment and machineries used in any process.

3. **Internet**

   There are many internet websites that have been referred to as a secondary source in gaining more information about method process of concreting superstructure elements. Internet have been a great helper in achieving more knowledge related to construction of superstructure in context of articles and visuals.

4. **Document reviews**

   Based on all drawings provided, there are many information achieve by doing studies on structural plans and drawings of related process of construction. Architectural drawings also help a lot to foresee on the outcome of all the construction process related to the case study.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Capaian Setia Sdn. Bhd. was established in Malaysia on May 27, 1993 and is based at address No. 29, Jalan Damai, Taman Damai, 34200 Parit Buntar, Perak.

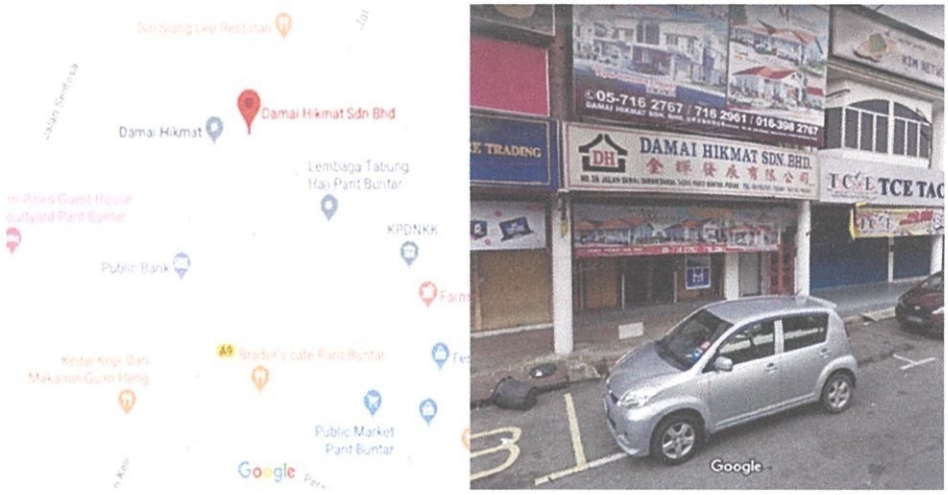


Figure 2.1 Location of office (Source: Google Maps)

The company conducts business activities related to construction development. Since its inception, Damai Hikmat Sdn. Bhd. led by Dato 'Yong Chai Seng has become one of the leading construction and building companies in the north.

Capaian Setia Sdn. Bhd. has successfully completed about 4000 units of mixed construction projects, including road and drainage works, land works such as bridges across the northern peninsula, especially in the towns of Parit Buntar, Bagan Serai, Nibong Tebal and Penang which have cost the most about RM 320 million.

The company is led by Dato 'Yong Chai Seng who always practices hard work and takes into account the needs of the people in carrying out his duties. He also often reminds his employees

to always be responsible for the work they do because it is likely that the company will be at a disadvantage.

He is often known for his friendly and have higher educational background. He also emphasized that his employees work in teams and be professional in all levels of work to achieve the goal of successfully completing projects that have been successfully commissioned.

The company has several subsidiaries under its subsidiary such as ATK Development Sdn. Bhd, Handal Mekar Sdn. Bhd, Simbol Kekal Sdn. Bhd, Jayaprise Sdn. Bhd, and a number of other subsidiaries that work on construction work. In addition to operating as a developer, the company also functions as a contractor.

The company's goals are in line with Vision 2020, which is to produce balanced physical and socioeconomic development and to eradicate poverty and improve the quality of life of the people. Economic growth will also ensure the well-being of the environment through the approach and concepts of Sustainable and environmentally friendly Development.

2.2 Company Logo

Figure 2.2 Capaian Setia Sdn. Bhd. Logo

2.3 Objectives, Visions and Mission Capaian Setia Sdn. Bhd.

2.3.1 Company Objectives

i. Design, examine, design and implement development.
ii. Carry out development in the local area.
iii. Improve the development and infrastructure of the area.
iv. Provide advice and co-operation on matters of sale, tender to local consultants and contractors.

2.3.2 Company Mission

The Company's mission is to contribute to the development of the state:

i. Developing state, regional, and regional development through mutual cooperation.
ii. Provides effective and innovative project management services.
iii. Strive to provide a better quality of life for all communities.
iv. Establish harmonious relationships with communities, consultants, contractors, and workers.

2.3.3 Company Visions

We will be a high quality provider through project management and engineering for creative and effective human capital based infrastructure development.

2.4 Company Profile

Name of Company	: CAPAIAN SETIA SDN. BHD.
Company Address	: NO. 29, JALAN DAMAI, TAMAN DAMAI, 34200 PARIT BUNTAR, PERAK DARUL RIDZUAN.
Date of Establishment	: 5 Mei 1993
Telephone No.	:
Fax No.	:
Company Registration No	: 265469-T
Board of Director	: Dato' Law Tien Seng (Chairman) : Dato' Yong Chai Seng (Director)
Major Business Activities	: Estate Development "Death-Care Business"

Details	**Developer details**
Name	: Dato' Yong Chai Seng
Address	: No. 19, Jalan Murai, Pekan Baru, 34200 Parit Buntar, Perak
No. Identification card	:
Date of Birth / Age	: 08 August 1958 (61 years old)
Graduation	: Sarjana Muda, Perumahan, Bangunan dan Perancangan (USM)
Work	: Director
Workplace	: Parit Buntar, Perak
Monthly salary	: RM 30,000.00
Work experience	: 22 years in construction and housing.

2.5 Organization Chart

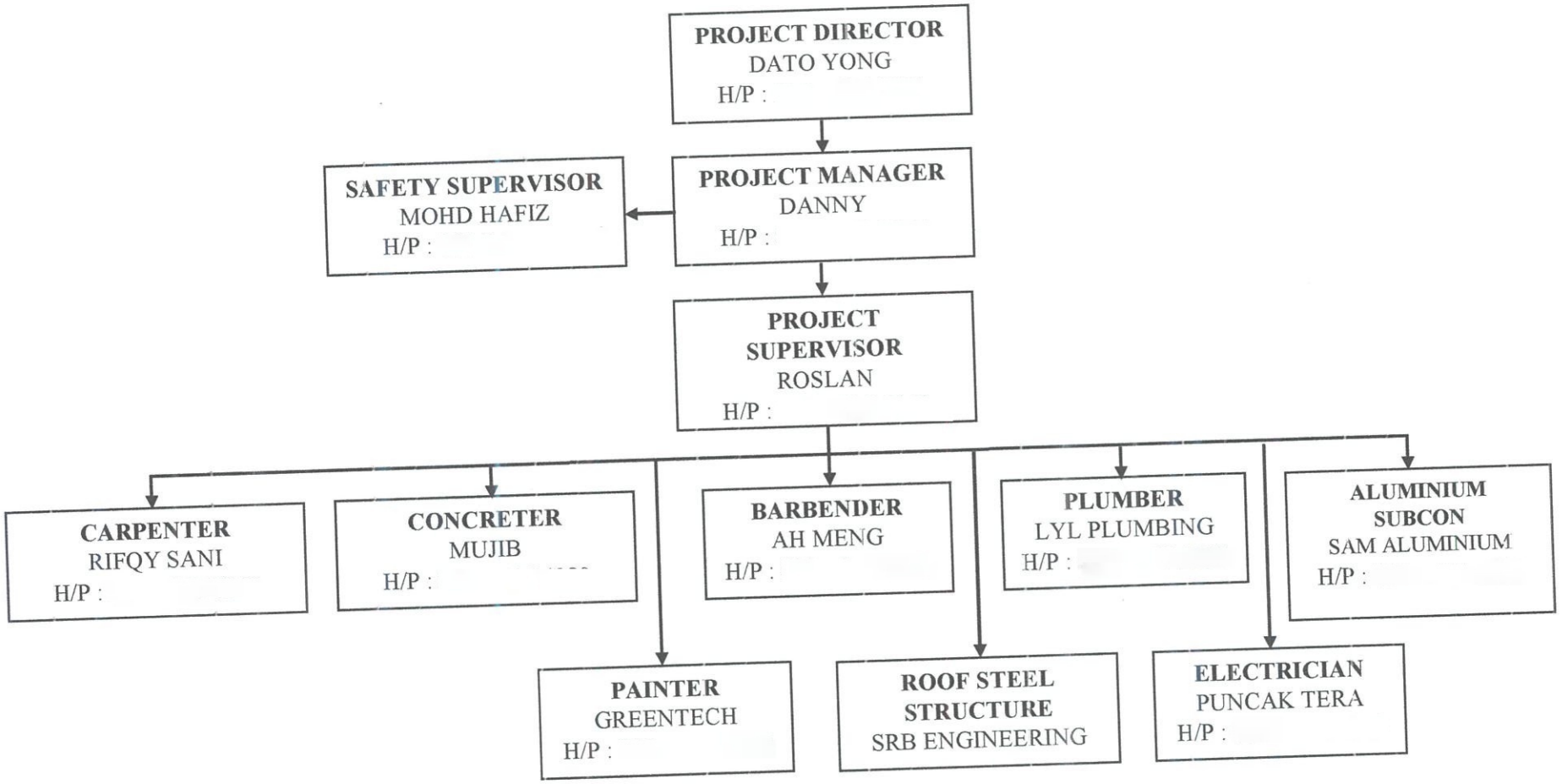


Figure 2.3 Organization Chart

2.6 List of Projects

2.6.1 List of completed projects

No.	Project Title	Project value	No. unit	Start Date	Completed Date
1	Taman Serai Permai 1, Bagan Serai, Perak.	23 million	251-rumah bercampur 29-rumah kedai	1998	2000
2	Taman Serai Permai 2, Bagan Serai, Perak.	30 million	423-pembangunan bercampur	2001	2007
3	Lot 3601, Mk. Bagan Serai, Perak.	3 million	30-rumah teres setingkat	2008	2010
4	Taman Seri Sentosa, Bagan Serai, Perak	8.5 million	99-rumah teres setingkat 4-rumah teres 2 tingkat	2008	2009

No.	Project Title	Project value	No. unit	Start Date	Completed Date
5	Taman Seri Emas II, Nibong Tebal, Pulau Pinang	37 million	32-rumah berkembar setingkat 239-rumah teres setingkat 44-rumah teres 2 tingkat	2009	2010/2011
6	Taiping Sentral Mall	17 million	Bangunan Sosial	2010	2011
7	Jalan Istana Larut, Business Park	7.3 million	18-kedai pejabat 2 tingkat 26-kedai pejabat 3 tingkat	2012	2015

No.	Project Title	Project value	No. unit	Start Date	Completed Date
8	Centre Point Suite, Tune Hotel	45 million	13-bilik penginapan <68-kondominium	2013	2014
9	Taman Jana III Utama	45 million	523-pembangunan bercampur	2012	2015
10	Mydin Mall, Parit Buntar	8 million	Pembangunan sosial terdiri daripada lebih daripada 127 biji kedai	2013	2015

Table 2.1 List of completed projects

2.6.2 List of in progress projects

No	Project Title	Project Value	No. Unit	Start Date	Expected Complete Date
1	Taman Serai Merbau, Bagan Serai, Perak	4.5 million	56-rumah teres setingkat	March 2017	January 2020
2	Taman Kurau Damai, Kuala Kurau, Perak	4.4 million	42-rumah teres 2 tingkat 12-rumah kedai	February 2017	December 2019
3	Taman Piandang Indah, Tanjung Piandang, Perak	5.4 million	46-rumah teres setingkat 20-rumah kedai	October 2017	December 2019
4	Taman Kerian Putra, Parit Buntar, Perak	500 million	806-rumah bercampur 83-kedai pejabat 2 tingkat 112-rumah bandar 100-rumah aman jaya 10 tingkat	December 2017	August 2023
5	Taman Nuri Emas, Nibong Tebal, Penang	5.2 million	64-rumah teres setingkat	May 2018	March 2020

Table 2.2 List of in progress projects

CHAPTER 3.0

CASE STUDY

3.1 Introduction to Case Study

The case study has been carried out at a project which **CADANGAN SKIM PEMBANGUNAN BERCAMPUR, DI ATAS TANAH KERAJAAN**

65 unit Rumah Teres 1-Tingkat Jenis A (PLOT 543-607) (PT9617-9681), 60 unit Rumah Teres 1-Tingkat Jenis B (PLOT 664-723) (PT9738-9797), 249 Unit Rumah Teres 2-Tingkat Jenis C (PLOT 84-193 & PLOT 404-542) (PT9158-9267 & PT9478-9616), 210 Unit Rumah Teres 2-Tingkat Jenis D (PLOT 194-403) (PT8258-9477), 33 Unit Rumah Berkembar 2-Tingkat (PLOT 724-761) (PT9798-9835), 83 Unit Kedai Pejabat 2-Tingkat (PLOT 1-83) (9075-9157), 112 Unit Rumah Bandar 2-Tingkat (PLOT 608-653) (PT9582-9737), 1 Blok Rumah Aman Jaya 10-Tingkat (100 Unit) (PLOT 764) in Mukim Parit Buntar, Daerah Kerian, Perak Darul Ridzuan. The cost for this project is around RM 500 million. This project has begun on 5th December 2017 and it is expected to fully complete on 5th August 2023 based on contract.

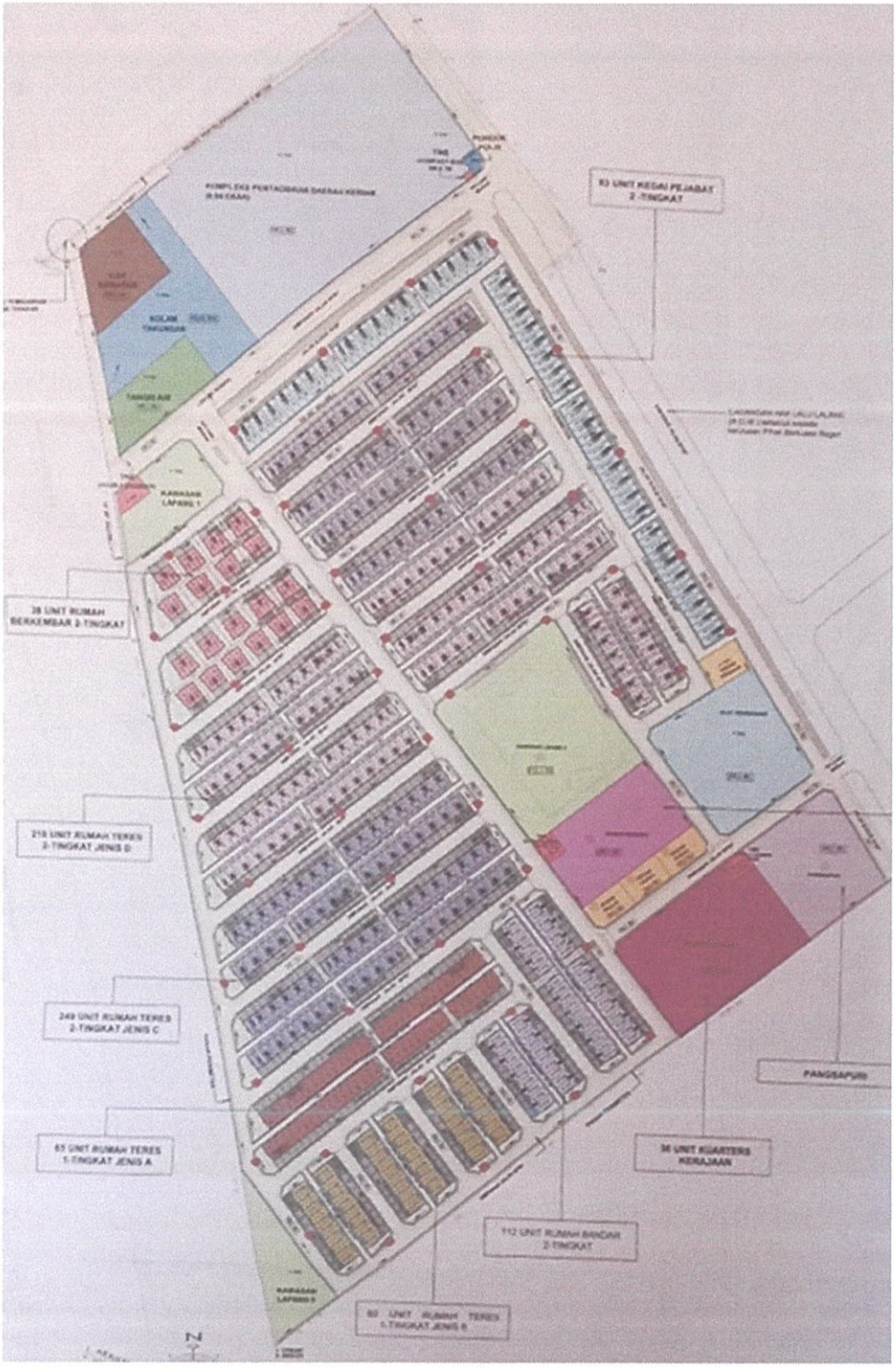


Figure 3.1 Plan of project site

3.2 Method and Process for Superstructure Construction

3.2.1 Design of formwork

Based on the case study at Mukim Parit Buntar, the developer has chosen a different type of design, material and sizing of each superstructure works construction since they were building a different type of building based on its need and functions. For addition information, before construction work begins, the workers are required to refer all construction drawings to ensure that all of the works comply strictly with the following acts in the contract. Figure 3.2 and Figure 3.3 below, show the design and installation of the superstructure formwork that was built by the contractor.

Figure 3.2 Design of formwork

Figure 3.3 Installation of formwork

Figure 3.4 Braced for formwork

In this stage, the workers will ensure that the formwork are fixed in perfect lines, grades and dimensions, with no crevices at joints. Figure 3.4 above show the braced that used in the formwork installation which were to securely braced the formwork, supported and wedged so as to retain its position without displacement or deflection during the placing and compaction of concrete.

All joints shall be either horizontal or vertical, unless otherwise required. Care should be taken, when re-using formwork, that its surface shall be smooth and clean and that it shall be free from warping twisting or other deformation Any formwork, which has in the opinion of the Engineer deteriorated sufficiently to render it unsuitable for the work shall be rejected and must be removed from the site within 48 hours or must be broken up a once, and new formwork to be provided at the Contractor's expense.

3.2.2 Fixing reinforcement bars

Next, the reinforcement bar of each of the superstructure elements as shown in the Figure 3.5 and Figure 3.6 has been prepared by the workers according to the size and specification given in the architect requirement.

Figure 3.5 BRC for ground slab

Figure 3.6 Reinforcement bars for column.

Figure 3.7 below show that the reinforcement bar was fixed accurately and securely in position. This is to ensure that the reinforcement was in the correct position in relation to the formwork to give the specified concrete cover and will not be displaced due to trafficking around site or during the placing and compaction of the concrete or any related operations. At the same time, a concrete spacing block was installed in between the reinforcement bar and formwork.

Figure 3.7 Installation of concrete spacing blocks

Figure 3.8 Concrete spacing blocks

The correct cover shall be maintained by the use of plastic spacers or other approved means. Concrete spacing blocks is approved for use. Concrete spacers should be comparable with strength, durability and form to the surrounding concrete. Spacers fixed are to parallel the reinforcement bars that cannot be located in a line across a section Timber, stone or metal spacers are not permitted. Starter bars to columns and walls must be securely fixed to the reinforcement in the parent concrete and accurately located to maintain the specified cover. Reinforcement embedded in hardened concrete shall not be bent.

3.2.3 Installation of pipework

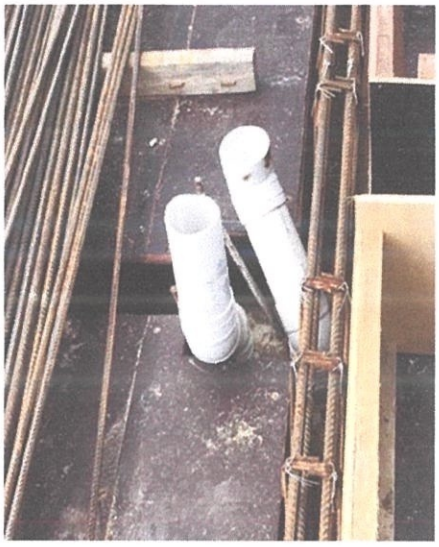


Figure 3.9 Installation of pipework

Figure 3.10 Installation of pipework

Mechanical and electrical piping was installed in this stage as shown in Figure 3.9 and Figure 3.10 which consist of electrical and alarm conduit, sanitary pipe, aircond drain pipe, rain water down pipe, and also the ventilation pipe. The position of each item was located in the correct position according to the drawing given by the architect. All pipe fittings shall be of the correct size. Changes in diameter shall be by means of reducers. Bushing down will not permitted.

3.2.4 Pouring concrete

For assessment of strength, a sample are taken from a randomly selected batch of concrete by taking a number of increments in accordance with BS 1881. The samples, whenever practicable, then taken at the point of discharge from the mixer or in the case of ready mixed concrete, the point of discharge from the delivery vehicle. 4 test cubes from each sample shall be prepared and cured in accordance with BS 1881. For additional information, placing of concrete will not proceeded until all of the testing are acceptable and approved according to the engineer's requirement.

Next, the process of transported, placed, and spread of concrete to form a superstructure element are proceed as show in the Figure 3.11, Figure 3.12 and Figure 3.13 below. The process of pouring the concrete mixture are done by using a bucket that was attached with a mobile crane.

Figure 3.11 Pouring concrete for slab

Figure 3.12 Pouring concrete for column

Figure 3.13 Pouring concrete for ground beam

should compact using the vibrators to ensure none of the problem such as honey-comb will appear in the final product. Figure 3.14 below show the concreter compacting the concrete mixer which was poured into the formwork by using a concrete vibrator.

Figure 3.14 Concreter is compacting the concrete

3.2.5 Stripping of formwork

After the concrete are left in a couple days which were stated in the architect's general notes. The reason why the concrete is left for a couple days was to allow the mortar to set and harden to achieve its initial bond strength.

Figure 3.15 Stripping of formwork

Figure 3.15 above show the stripping of formwork activities. Formwork should be removed without cause any damage to or overstress in the concrete. Formwork should not be removed before the concrete has sufficiently set and hardened after 24 hours to 48 hours (as per engineer's decision)

3.3 The Elements Required in the Superstructure Construction Process

3.3.1 Column

Figure 3.16 Inspection reinforcement bars before formwork

Figure 3.17 Inspection the vertically before concreting

Column is a vertical member which takes complete load of the beam, slabs and the entire structure and the floor and other area of the building is adjusted as per the requirement of the client or owner.

The size of the columns, quantity of cement sand and aggregate to be mixed, the number of steel bars to be placed, spacing between the stirrups is all mentioned in the structural drawing which is designed by structural designer as per the actual load on the column and considering the factor of safety.

A column is a vertical member which effectively takes load by compression. Basically column is a compression member as load acts along its longitudinal axis. Bending moment may occur due to wind earthquake or accidental loads.

Column transfers the load of the structure of slabs beams above to below, and finally load is transferred to the soil. Position of the columns should be so that there are no tensile stresses developed at the cross section of the columns. Columns location should be such that it hides in the walls partially or fully.

3.3.1.1 Requirement and consideration for construction column

1. Setting out line mark by main contractor 500mm from gridlines for both side of brick wall upon completion of floor slab.
2. Make sure the vertically of the column. To plumb corner column and pull string to all edges and party wall.
3. Make sure the size, quantity and arrangement of reinforcement and the link are following the engineer design.
4. Make sure concrete cover is according to Engineer requirement. Use plastic wheel spacer.
5. Additional of floor height of 2 inch to allow for floor finishing work. (Ground floor/first floor power float finishes with flat sheet ceiling).
6. Additional of floor height of 5 inch to allow for plaster ceiling at last level with tiling works.

7. Ensure the starter bar for each column is sufficient. (46 x diameter).
8. The formwork for column should follow the design in drawing. Use screw and nut system to ensure formwork is well tied if the column is big (usually < 300).
9. Dowel bar for brick work should be install interval of 2ft.
10. Do not forget to allow pipe sleeve opening for plumbing and electrical work.
11. To put poker in the column.
12. Removal of column formwork = minimum 48 hours.

3.3.2 Construction of beam

Figure 3.18 Formwork of beam

A beam is a structural member which spans horizontally between supports and carries loads which act at right angles to the length of the beam. The width and depth of a typical beam are "small" compared to their span. Generally, the width and depth of are less than 10 cm.

Usually, a beam is exposed to two sets of external forces and two types of internal forces. The external loads are the loads applied to the beam and reactions to the loads from the supports. The two types of internal force are bending moments and shear forces. The internal shear force and the internal bending moment can be represented as pairs of forces. The Figure below shows a Typical Beam with Internal and external forces acting on it.

3.3.2.1 Procedure for ground beam construction

Ground beam

Figure 3.19 Installation formwork of ground beam

1. Determine the location of ground beam.
2. All formwork needs to apply with a layer of used oil plus diesel before using
3. Lean con is to be laid before installing reinforcement. Make sure column stump is free of lean con and dirt. Do sloping down where necessary.
4. Make sure the reinforcement and the link are as shown in C&S Engineering drawing.
5. The formwork should be strut properly and free from gap to avoid concrete leakage during concreting work.
6. Ensure that the spacer block is apply before pouring the concrete.
7. Counter check the right angle for building. To provide drop area for car porch, toilet etc.
8. Do not forget to allow pipe sleeve opening for building and electrical work.
9. To install stiffener as per drawing.
10. For beam next to perimeter apron/car porch install starter bar to prevent cracks to apron.
11. Ground slab to sit on top of full ground beam size for suspended slab (depends on engineer's approval). Propose Y10 @ 300c/c.
12. Ground beam width tolerance allowance-5mm.

Roof beam

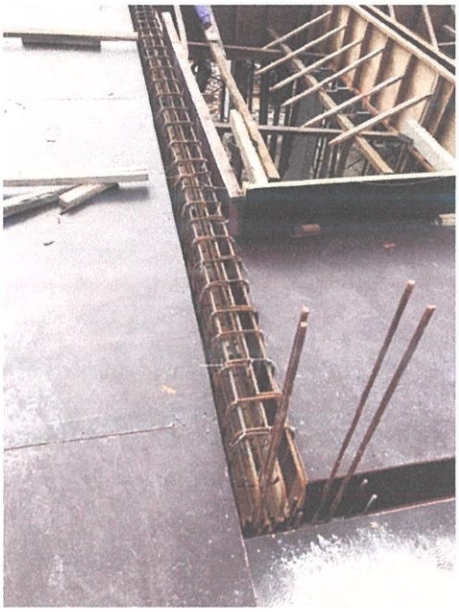


Figure 3.20 Installation reinforcement bars for roof beam

1. Make sure the roof beam are levels.
2. To consider allowance for ceiling and tiling. Normal case is 125mm allowance for roof beam. For high rise construction normally do not practice allowance.
3. To install stiffener for roofing work and future brickwork purpose.
4. Never miss out all coping for architectural design.
5. Removed all formwork and strut at gutter area during concreting and proper patching to prevent leakage.
6. Make sure cleaning work is carried out at ground/first floor slab after concreting roof beam.

3.3.3 Construction of slab

Figure 3.21 Pouring concrete for slab

Concrete slabs are form for roof and floors of reinforced concrete buildings. Usually, slabs will be designed to act as diaphragms to transfer horizontal loads to the structural frame. Slabs are often reinforced with welded wire fabric, but can also bond directly to a steel deck. The deck is supported by joists, which may be open web steel joists or concrete.

Slabs transfer loads in either one or two directions. A one-way slab is usually longer than its spanning width. The load will flow perpendicular to the long axis. Two-way slabs are roughly square in plan, and the load is dispersed along both axes.

3.3.3.1 Requirement and consideration for construction slab

1. Make sure pre order materials such as BRC cut to size, scaffolding, U head, Jack base and formwork. Scaffolding, U head and Jack base must mark with blue paint to avoid theft.
2. Make sure the size, quantity and arrangement of B.R.C follow the engineer design. (Short span and long span is placed accordingly)
3. Ensure the slab are level. Additional of floor height of 2 inch to allow for floor finishing work
4. Make sure all drop area are allowed. (Toilet drop should add 1 inch to allow tiles lay to fall).

5. Toilet and gutter area NOT ALLOW using spaces Block. Must use steel bar chair to prevent leakage.
6. The formwork for slab should be strong enough and can support the concrete load. Check all prop and scaffolding bracing properly install.
7. Never miss out all coping for architectural design to avoid TO. Determine location of stiffeners (if additional is required).
8. Formwork for toilet and drops area, size must be slightly bigger from architectural dimension.

3.4 Problem and Solution

3.4.1 Problem honey-comb on structures

Figure 3.22 Honeycomb defect

Honeycombing is usually found in vertical rather than in horizontal surfaces and can occasionally extend completely through. Honeycomb happened because of bleed water carrying fine aggregates to the surface or the concreter not compacted properly while casting.

Solution

- Using mortar paste to fill in honeycomb.
- Make sure the concreter compact the concrete using vibrator sufficiently.

3.4.2 Exposed steel reinforcement

Figure 3.23 Steel bar visible out from structure

Steel bars coming out from structure may affect the strength of structure. This defect happened because the bar bender not using the spacing.

Solution

- Paste the cement to cover the steel
- Make sure the barbender use the spacing block to make a gap between formwork.

CHAPTER 4.0

CONCLUSION

Superstructure is an important structure which worked as a frame of a building. A superstructure is very importance element to the construction industry because of its function and purpose which act as a load transfer from the upper to the lower part of the structure (Substructure).

The construction of the superstructure is the first stage must follow the right procedure to construct it. Besides that, the material of the pad footing also important to make sure the superstructure is strong to carried load. Without the equipment, this superstructure part cannot be done. Before construct the superstructure, the equipment like formwork, and reinforcement must be ready first then followed by concreting process.

Method that were used to construct the superstructure is same like the theory in the books. All the equipment and materials use are also same like what have been mention in the books and article. The problems occur only when there are not enough compacting activities done at the concrete area which can caused honey-comb after the concrete was harden. Next, the late arrival of reinforcement bar and need to be wait for few days This problem had made the pad footing cannot be concrete and make the progress to construct the pad footing has been delay. But this problem had been solving quickly by the company. the reinforcement manages to arrive only in one day.

To concrete the superstructure element, site supervisor must get permission from the resident engineer with provide the request for information (RFI) that need the Resident Engineer to sign and approve the RFI. The Resident Engineer will check the reinforcement bar of the superstructure part and give approval to concrete the superstructure.

All of the workers also follow the rule from the site safety supervisor by wearing the safety helmet, safety boots and suitable clothes on the site construction. All the workers know the personal protective equipment (PPE) when they are in the construction. Toolbox meeting will be held every Wednesday and Friday to give more safety information when on the site construction. All problems that occur on the site construction has been handle with successfully by the site supervisor and all workers on the site.

REFERENCES

Chudley, Roy. (1973). Pearson. *Construction Technology.*

Gopal Mishra. (2018). Civil Engineering Home. *Types of Formwork (Shuttering) for Concrete Construction and its Properties.*

Keith Ginnado, Douglas, E. Elisworth. (1991). *Guide for visual inspection of structural concrete building components.* USA: US Army Corps of Engineers.

Mishra, Gopal. (2017). Civil Engineering Home. *What is Substructure and Superstructure in Building Construction?*

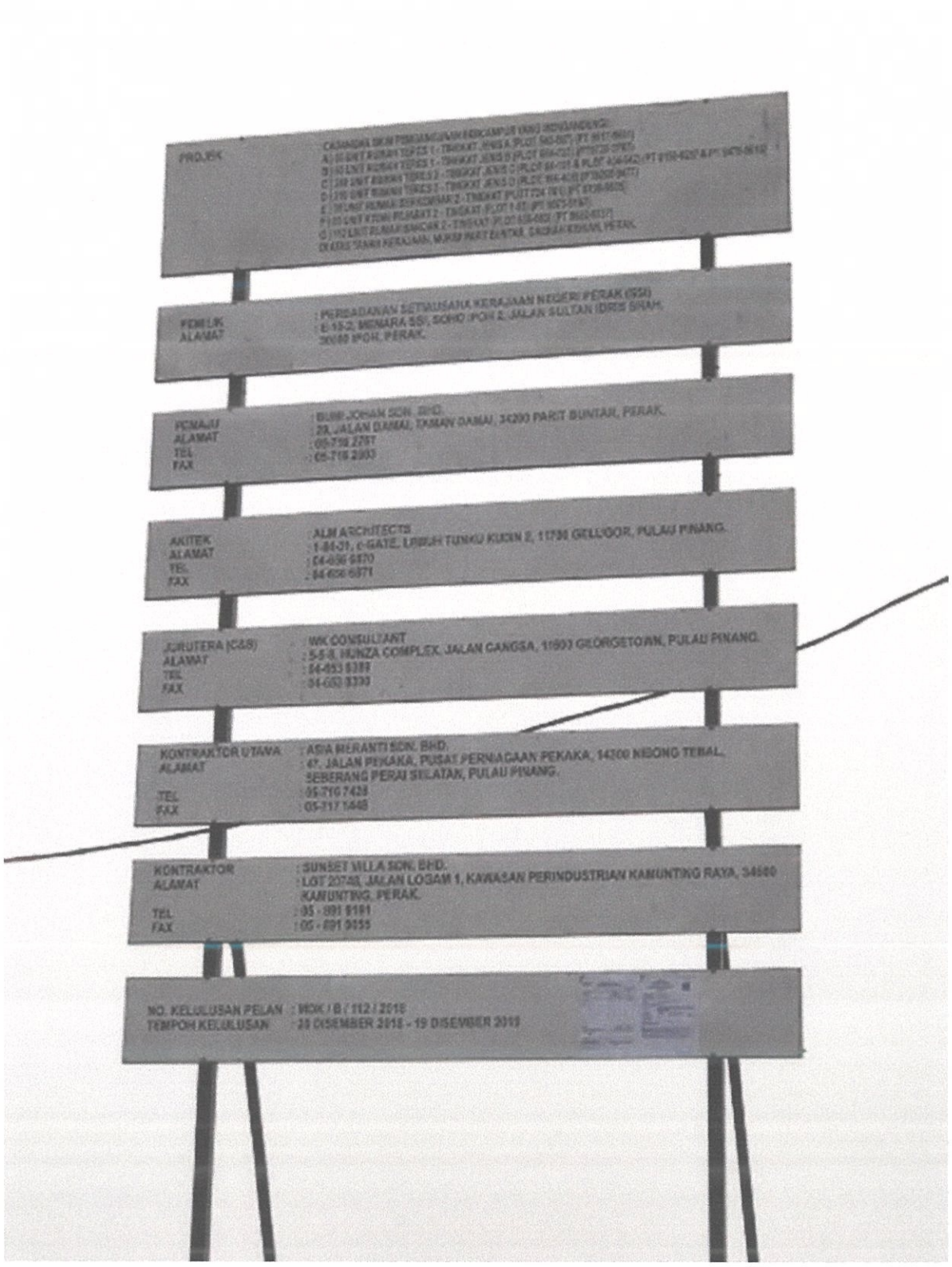
Rodriquez, J. (2019). *How to Solve Common Concrete Problems*. Retrieved from

Tamiri, P, (2016). Superstructure. *Chartered Civil Engineer from Institution of Civil Engineers, UK*

APPENDIX


PROJEK: KERJA TANAH BAGI CADANGAN SKIM PEMBANGUNAN BERCAMPUR DI ATAS TANAH KERAJAAN SELUAS 80 EKAR, MUKIM PARIT BUNTAR, DAERAH KERIAN, PERAK DARUL RIDZUAN
PEMILIK: PERBADANAN SETIAUSAHA KERAJAAN NEGERI PERAK DARUL RIDZUAN (SSI) NO. E-10-2, MENARA SSI, SOHO IPOH 2, JALAN SULTAN IDRIS SHAH, 30000 IPOH, PERAK DARUL RIDZUAN.
ARKITEK/PELIKIS PELAN: ALM ARCHITECTS 1-04-31, E-GATE, LEBUH TUNKU KUDIN 2, 11700 GELUGOR, PULAU PINANG.
PEMAJU: BUMI JOHAN SDN. BHD. NO. 29, JALAN DAMAI, TAMAN DAMAI, 34200 PARIT BUNTAR, PERAK DARUL RIDZUAN.
PEMBORONG: KIM HUAT 168 ENTERPRISE LOT 9704, JALAN TAIPING, ROAD NO. 168, SUNGAI BOGAK, 34200 PARIT BUNTAR, PERAK DARUL RIDZUAN.
NO. KELULUSAN PELAN: MDK/P/06/2018
TEMPOH KELULUSAN PELAN: 23 MAC 2018-22 MAC 2019
WAKTU OPERASI KERJA TANAH: ISNIN-JUMAAT-8.00 PAGI-6.00 PETANG (HARI SABTU, AHAD DAN CUTI AWAM KERJA TANAH TIDAK BOLEH DIJALANKAN KECUALI DENGAN KEBENARAN)
RAKYAT BERSIH NEGARA SIHAT


PERAK
KERAJAAN NEGERI PERAK DARUL RIDZUAN
CADANGAN MEMBINA 1 BLOK RUMAH AMAN JAYA
10-TINGKAT (100 UNIT) DI ATAS TANAH KERAJAAN (PLOT 764),
MUKIM PARIT BUNTAR, DAERAH KERIAN, PERAK DARUL RIDZUAN.
UNTUK TETUAN PERBADANAN SETIAUSAHA KERAJAAN NEGERI PERAK /
LEMBAGA PERUMAHAN DAN HARTANAH PERAK


PROJEK
PEMILIK
ALAMAT
PEMAJU
ALAMAT
TEL
FAX
AKITEK
ALAMAT
TEL
FAX
JURUTERA (C&S)
ALAMAT
TEL
FAX
KONTRAKTOR UTAMA
ALAMAT
TEL
FAX
KONTRAKTOR
ALAMAT
TEL
FAX
NO. KELULUSAN PELAN
TEMPOH KELULUSAN
: MDK / B (112) 2010
: 20 DISEMBER 2010 - 19 DISEMBER 2010