DEPARTMENT OF BUILDING SURVEYING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR

CUBE TEST AND SLUMP TEST

NOR FATHIN FAKHIRA BINTI ABDUL AZIZ
(2015869422)
DIPLOMA IN BUILDING SURVEYING

PRACTICAL TRAINING REPORT
MARCH – JULY 2018

ACKNOWLEDGEMENT

I would like to express my gratitude and appreciation to those who gave me the possibility to complete my practical training report. A special thanks to my supervisor at JKR Hulu Perak, Pn.Roshidawati Bt Rohizat whose help give suggestion and encouragement to me for complete my report on time.

I also would like to acknowledge with much appreciation the crucial role of the staff of assistant engineer who gave the permission and help me to study all file project Klinik Kesihatan Jenis 6. She also give me explanation about my case study and tells me what the problem occur.

Besides, a special thanks to my supervisor lecturer, Pn.Noorazlina Kamarulzaman and all the UITM lecturers Mr. Faisal Bin Bahardin and Miss.NazhatulZalkis who give full effort guiding me in achieving the goal as well as her encouragement to maintain my progress on track. I would like to give special thanks to my group mate because they help give a lot of suggestion and opinion to finish my report.

TABLE OF CONTENT

LIST OF FIGURE

LIST OF TABLE

ABSTRACT

Industrial training is an important phase of a student life. A well planned, properly executed and evaluated industrial training helps a lot in developing a professional attitude. But at time industrial training, student must do report before finished my industrial training.

The aim of industrial training report to develop the student's intellectual, power and ability in analyzing fact finding and investigation through relevant scientific and qualitative analysis. Other aim is to educate the student in dealing with the implication of developments and awareness of factors affecting the built environment and society.

During my internship, I was located at building department of Public Work Department, Hulu Perak. I lad gained knowledge and information through construction site as I joined the staff to the site visit. I also can see the problem that occur at site and the process of the construction.

CHAPTER 1:
ORGANIZATION BACKGROUND

1.0 INTRODUCTION

In that chapter 1 is describe about organization background. This chapter know about the objective of company, vision and mission. Chapter 1 also showing the specific map such as location plan, site plan and key plan. In addition, we can know about the organization structure at Public Work Department Hulu Perak and describing the objective and function of Building Department. Chapter1 also describe about the scope of work Building Department that has put me in the practical training for 4 months as the intern. Besides, it also describe the policies of JKR Hulu Perak and the adjacent building at Public Work Hulu Perak.

1.1 HISTORY ORGANIZATION

Re-opening the early history of the realization of a Ministry was actually a little overturned to the establishment of small departments during the reign of the British especially when the British began interviewing in the Malay States after the signing of the Pangkor Treaty on 17th – 20th January 1874.

One of the oldest departments created by the Crown Colony before the Pangkor Treaty was the "Public Works Department" (PWD) or later known as the Public Works Department (JKR) establish in 1872. Its establishment aims to provide infrastructure for socio-economic development and system British government politic in the Straits Settlements comprised of Singapore, Malacca, Perak (Walls), Seberang Perai and Penang Major J.FA. Mcnair, formal Colonial Engineer of the Straits Settlements was the first person to be appointed to head the Public Works Department.

In 1954, the British Government took steps to separate the Malaya administration from its Singapore based administration. This is the beginning of the commencement of government departments in Malaya to allow their respective policies and programs. In 1955, the first Federal Election at the Legislative Council marked the moment of power transfers between locals from the British administration before the independence process of Malaya.

Public Works Department have being maintained and placed under the administration of this Ministry. The director of the Public Work Department is responsible to the Minister in relation to the policy matters of the Ministry.

(PWD, 2015)

1.1.1 ORGANIZATION BACKGROUND

Figure 1: PWD Logo

The Public Works Department (JKR) Hulu Perak District is the largest technical department in the department in the Hulu Perak District. JKR Hulu Perak is an implementing agency for infrastructure and public infrastructure development project for the State and the Federal Government.

Public Work Department Hulu Perak is led by the District Engineer, which is Ir. Andy Surin A/L Ah Khoo Chai. He rejoin the Public Work Department Hulu Perak from early March 2018. He was assisted by the two engineers, which is Building engineers and Road engineers. In addition, Public Work Department Hulu Perak is also assisted by 32 Assistant Engineers from various divisions. Public Work Department Hulu Perak now has 129 Officers and employees from the professional and Support Management Group comprising the state and federal employees.

Besides, Hulu Perak Public Work Department had previously operated in the Perak state Government Building located next to the Gerik District Court. Currently Public Work Department Hulu Perak operates in the new buildings

located at Jalan Suda Utama, Air Suda, Gerik. The new building worth RM 3.6 million was occupied in the 2008 was inaugurated by His Majesty the Sultan of Perak on 6 July 2010.

Hulu Perak District consists of 3 small districts, covering 85128.79 hectares of Lenggong Small District, Gerik. The total length of the road maintained by the Hulu Perak JKR is 355,219 kilometers, comprising state roads and federal roads.

1.1.2 MAPS PUBLIC WORK DEPARTMENT

KEY PLAN

Figure 2: Key Plan of PWD Hulu Perak

LOCATION PLAN

Figure 3: Location Plan at PWD Hulu Perak

SITE PLAN

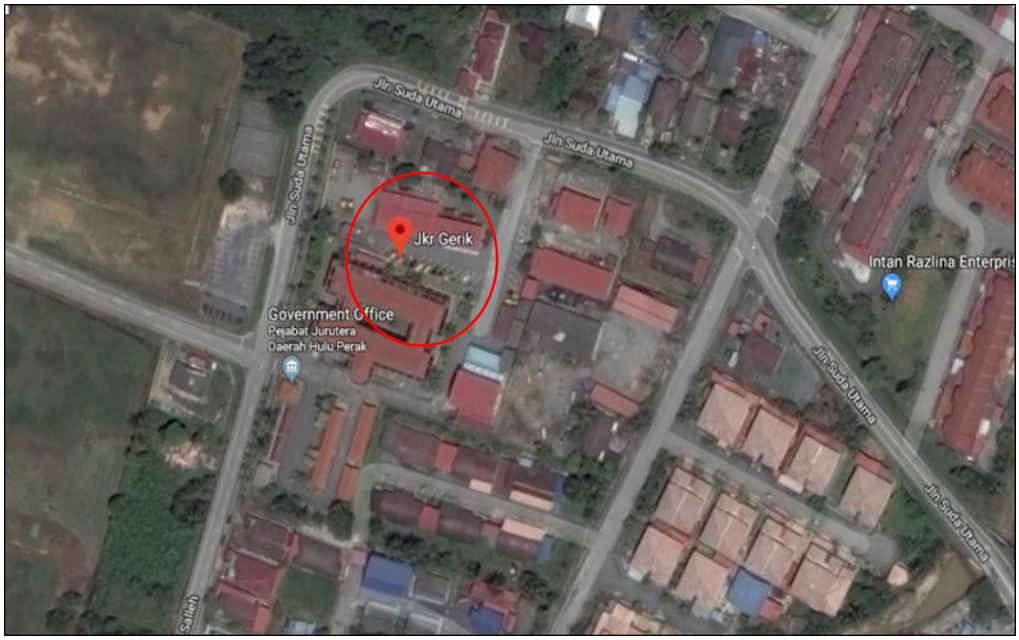


Figure 4: Site Plan of PWD Hulu Perak

1.2 GENERAL INFORMATION

GENERAL INFORMATION	DESCRIPTION
NAME	JKR Hulu Perak
OWNER OF THE BUILDING	JKR Hulu Perak
ADRESS OF BUILDING	Pejabat Jurutera Daerah, JKR Hulu Perak Jalan Air Suda Utama, 33300 Gerik, Perak
HEIGHT OF STOREY	2 storey
FUNCTION	Office Building
COST	3.6 Million
YEAR OF OPERATION	2008
NUMBER TELEPHONE	05- 7911040
NUMBER FAX	05- 7912033

Table 1: General Information of PWD

1.3 BUILDING VIEW

Figure 5: Front Elevation of the PWD Hulu Perak

Figure 6: Rear Elevation of the PWD Hulu Perak

Figure 7: Left Elevation of the PWD building

1.4 LOGO OF JABATAN KERJA RAYA (JKR)

In general, the displayed logo reflects the diversity of work areas entrusted to Jabatan Kerja Raya (JKR)

Colour

- Yellow - represents the maturity of the JKR brand as one of the oldest organization creates and reflects mature images in achieving its objectives
- Black - represents the quality of branches in the JKR organization entrusted to implement development
- Grey - represents the low self- esteem in services among the workers in the JKR

1.4.1 SYMBOL

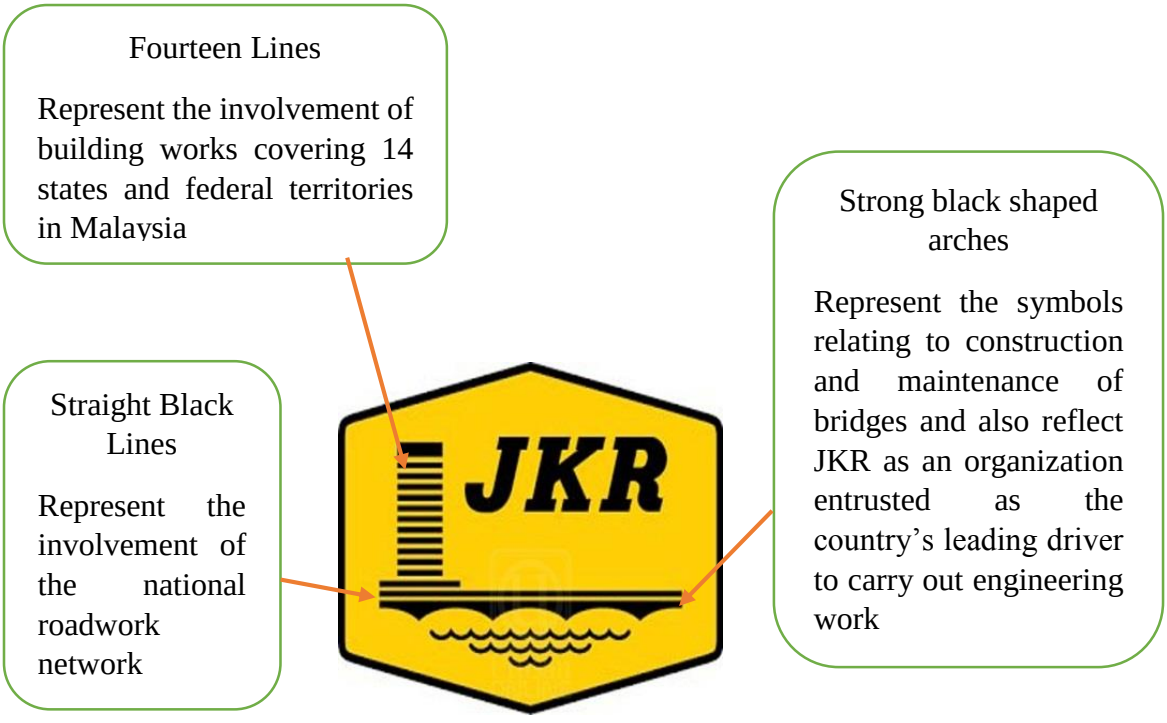


Figure 8: PWD Logo

1.5 MISSION, VISION AND OBJECTIVE

Mission of the Perak Public Works Departments is to contribute to the development of the country by:

- Help our customers realize basic information and deliver services through collaboration as a strategic partner.
- Providing an effective and innovative asset and project management services
- We strive to provide better quality of life to all staff
- Strengthen existing engineering competencies
- Develop new human capital and competence
- Prioritize integrity in providing services
- Building a harmonious relationship with the community
- Preserve the environment in service delivery

1.5.1 VISION

We will become a World Class Services Provider and Center of Excellence in Asset Management and Engineering for National Infrastructure Development on Creative and Innovative Human Capital and Recent Technologies

1.5.2 OBJECTIVE OF THE JKR HULU PERAK

As the key Consultant to the Government of Malaysia and the Perak state Government, the Perak Public Works Department has promised to deliver the Quality Project, Time and Currency Projects

1.6 SCOPE OF WORKS

SCOPE OF WORK BUILDING DEPARTMENT

To provide infrastructure and public utilities street particular, water supply, air – port building, port and terminal to meet the needs of the national development with always focus on giving:

i. Possible period of time
ii. Economical cost
iii. Appearance of the best quality
iv. Submit project meets QUALITY,TIME,COSTS specific

Objective

i. The functionality of the product as designed
ii. Ensure the consumer safety
iii. Ease of maintenance
iv. Make sure the quality of workmanship

Function

i. Planning, inspection, design and implementation of infrastructure facilities
ii. Where the need to carry out infrastructure
iii. Maintenance of infrastructure facilities
iv. Provide advice on technical matters to the government, local authorities and statutory bodies

1.7 ADJACENT BUILDING

Picture	Address
 Figure 9: *Pejabat Daerah Dan Tanah Hulu Perak*	Building Name : *Pejabat Daerah Dan Tanah* Address: Jalan Sultan Yusof, 33300 Gerik, Negeri Perak
 Figure 10: *Pejabat Pedidikan Daerah Hulu Perak*	Building Name : *Pejabat Pendidikan Daerah Hulu Perak* Address: Jalan Haji Meor Yahya Taman Inai Henna Garden, 33300 Gerik, Negeri Perak

Figure 11: *Hospital Gerik*

Building Name:

Hospital Gerik

Address: Jalan Intan,

Pekan Gerik,

33300 Gerik,

Negeri Perak.

Figure 12: *Majlis Daerah Gerik*

Building Name:

Pejabat Majlis Daerah Gerik

Address: Pejabat Majlis Daerah Gerik, Jalan Haji Meor Yahya,

33300 Gerik, Perak.

1.8 ORGANIZATION CHART PWD HULU PERAK

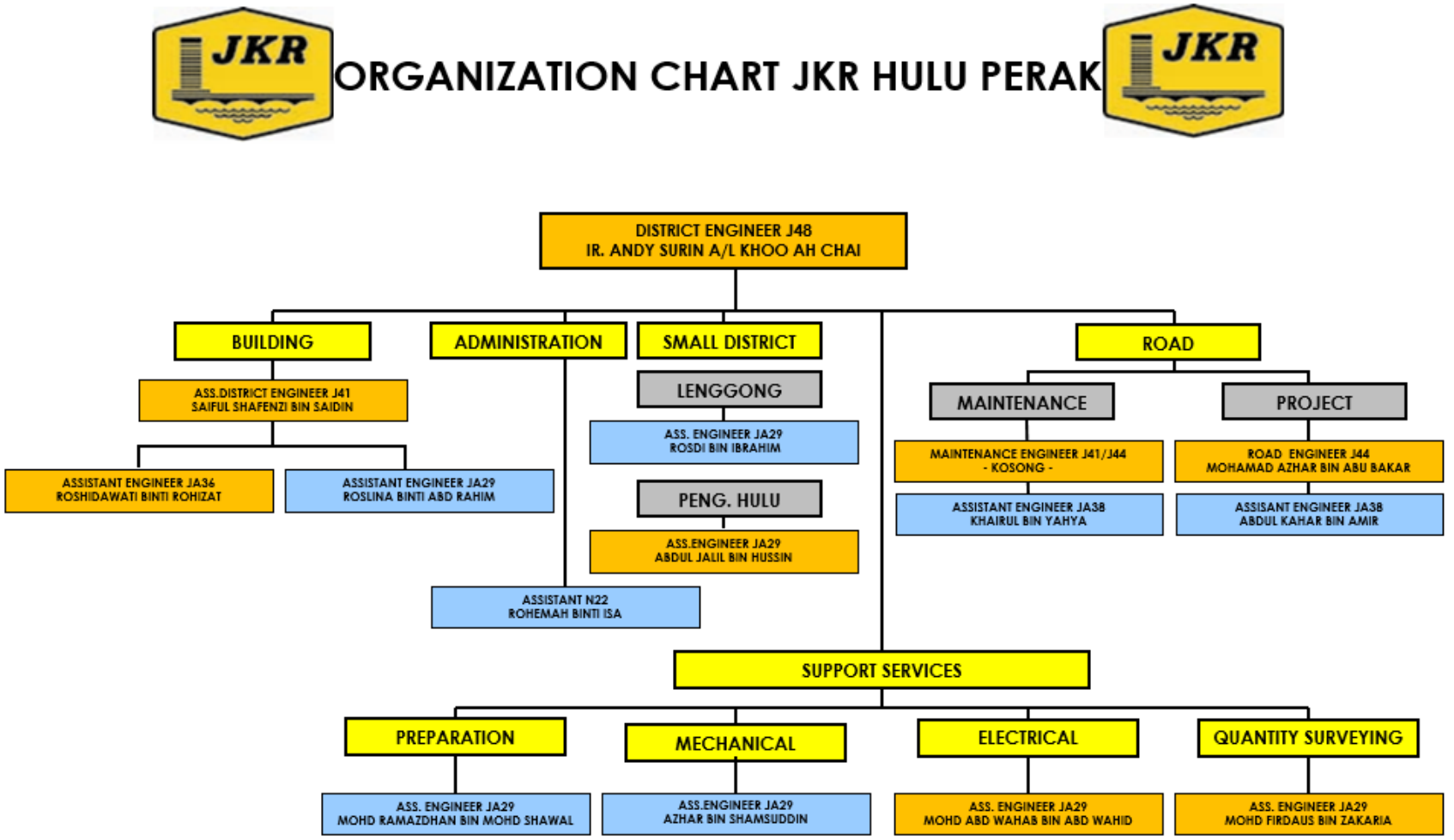


Figure 13: Organization Chart PWD

1.8.1 ORGANIZATION CHART PWD HULU PERAK (BUILDING DEPARTMENT)

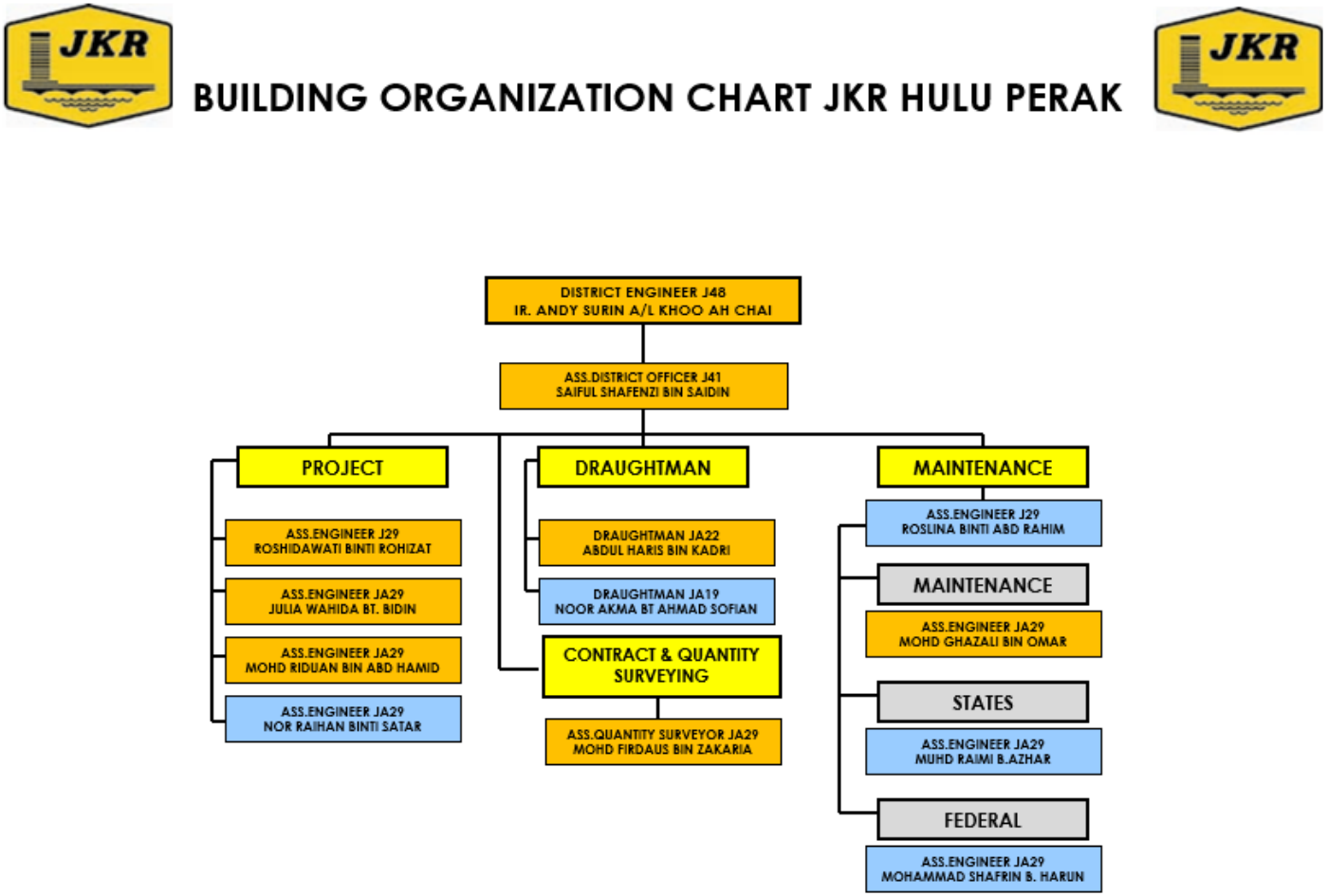


Figure 14: Building Chart

1.9 SUMMARY

In summary, the chapter more about understanding scope of work at PWD Hulu Perak for building department, function of PWD, vision and mission. There are also a few picture about the building surrounding of PWD Hulu Perak and building view. There are also limitation for view at the right side of PWD Hulu Perak because there are main road that was busy. Then, this chapter also have organization for building department and main organization.

CHAPTER 2:

THEORETICAL STUDY/

LITERATURE REVIEW

2.0 INTRODUCTION OF CONCRETE

Concrete is a composite material composed of fine and coarse aggregate bonded together with a fluid cement (cement paste) that hardens over time. Most concretes used are lime- based concrete such as Portland cement concrete or concretes made with other hydraulic cements such as calcium aluminate cements. However, asphalt concrete which is frequently used for road surfaces is also a type of concrete, where the cement material is bitumen and polymer concrete are sometimes used where the cementing material is a polymer.

Concrete is most durable building materials. It provides superiors fire resistances compared with wooden construction and gains strength over time. Structures made of concrete can have a long service life. Concrete is used more than any other human-made material in the world. As of 2006, about 75 billion cubic meters of concrete are made each year more than one cubic meter for every person on Earth. (https://en.m.wikipedia.org/wiki/Concrete)

2.1 DEFINITION OF SLUMP TEST

The slump test measures the consistency of fresh concrete before it sets. It is performed to check the workability of freshly made concrete, and therefore the ease with which concrete flows. It also can be used as an indicator of an improperly mixed batch. The test is popular due to the simplicity of apparatus used and simple procedure. The slump testis used to ensure uniformity for different loads of concrete under field conditions.

Using this test, the slump can be derived by measuring the drop from the top of the slumped fresh concrete. In the task of concrete mixture design, the prediction of concrete flow ability is critical for on-site construction. As the complexity of concrete construction escalates, there is an increasing pressure on material engineer to achieve high workability as well as to maintain the necessary mechanical properties to meet the design specifications.

(https://www.hindawi.com/jounals/jcen/2016/50)

Figure 15: Slump Test

2.2 DEFINITION OF CUBE TEST

The concrete cube test is the compression test carried out on the concrete cubes after 3,7,14 and 28 days of casting. Concrete cubes are casted and kept for water curing and then they are tested on the compression testing machine. Sometimes strength is also tested on 3rd and 14th day. A concrete cubes is a sample cube having each dimension of 150 mm. The strength obtained determines the compressive strength of concrete used in works.

(Thapar, 2017)

Compressive strength or compression strength is the capacity of a material or structure to withstand loads tending to reduce size as opposed to tensile strength, which withstands loads tending to elongate. In other words, compression (being push together), whereas tensile strength resists tension (being push apart). In the study of strength of materials, tensile strength, compressive strength and shear strength can be analyzed independently.

(P.Groover, 2018)

Figure 16: Cube Test

2.3 CLASSIFICATION OF CONCRETE

In engineering, there are several types of concrete that use in construction:

2.3.1 Lightweight Concrete

Lightweight concrete can be used for structural applications with strength equivalent to normal weight concrete. There are may have dry densities between 400 kg/m³ and 200 kg/m³ (structural lightweight concrete) compared with 2000-2600 kg/m³. The elastic modulus of lightweight concrete is lower than the equivalent strength normal weight concrete, but when considering the deflection of a slab or beam, this is countered by the reduced self - weight.

The lighter the concrete, the greater are the differences to be accounted for in the properties of the concrete. The tensile strength, ultimate strains and shear strengths are all lower than a normal weight concrete with the same cylinder strength. Creep and shrinkage for lightweight concrete are higher than that for the equivalent normal weight concrete. Batching of lightweight concrete is normally done from the ready mixes producers. Pumping lightweight concrete can be achieved but care needs to be taken so that the concrete mix does not separated. Lightweight may be made broadly classified into three types no fines, lightweight aggregates and aerated concrete

(MPA, 2015)

The Advantages of Lightweight Concrete

i. Produced lower as foundation loads and are particularly useful in upper storeys tall buildings

ii. Place in higher lifts than dense concrete on account of lower from work pressure

iii. Improve the thermal performance of buildings

iv. Better fire resistance than dense concrete

v. Lightweight aggregates are often produced from waste product hence they are reasonably cheap

vi. Fixing may be made more easily than dense concrete

Figure 17: Lightweight Concrete

2.3.2 Lean Concrete

Lean concrete as known as dry lean concrete, this material may contain as little as 5% cement by weight. Lean concrete has a lower than the amount of liquid present in the strata. This makes ideal as a base layer where other kinds of concrete are placed on top. It provides a flat bottom in uneven or dirt terrain. It normally use for road based being compacted heavy or vibrating rollers (compacting roller), so that workability may be much lower than is normally possible for concrete.

(Callabero, 2018)

Figure 18: Lean Concrete

2.3.3 Reinforced Concrete

It also called RCC (Reinforced Cement Concrete). In this concrete type steel in various forms is used as reinforcement to give very high tensile strength. In fact, it is because of the combined action of plain concrete (having high compressive strength) and steel (having high tensile strength). The steel reinforcement is cast in the foam of rods, bars, meshes and all conceivable shapes. Every care is taken to ensure the maximum bond between the reinforcement and the concrete during the setting and the hardening process. To produced reinforced concrete, steel is the first positioned in the mould and then fixed to prevent movement under forces arising from placing and compaction. The steel passive is at this point it to carries no load. After hardening the concrete, hardening the concrete the element is stressed, load must be communicated to the steel through the concrete.

Thus, the resulting material (RCC) is capable of bearing all types of stress in any type of construction. The RCC or reinforced cement concrete is the most important concrete type.

(Ullah, 2017)

Figure 19: Reinforced Concrete

2.3.4 High Strength Concrete

High strength concrete may be defined as concrete with a specified characteristic cube strength between 60 and 100 N/mm², although higher strength have been achieved and used. The method and technology for producing high strength concrete are not substantially different from those required for normal strength concrete. They are often used in the construction of high loads bearing columns and for many products in precast plants. High strength concrete is suitable for application in high rise buildings especially in earthquakes areas. In addition pre stressed bridge constructions require high compressive strength leading to wider spans.

(Sika, 2018)

High strength concrete characterized:

i. 28 days compressive strength between 60 and 120 MPa
ii. Increased tensile and flexural strength
iii. Low permeable binder matrix leading to high durability
iv. Reduced creep and enhanced resistance to pollutants

Advantages High Strength Concrete

i. Rates of strength gain are increased permitting faster construction

ii. High strength concrete usually have a high strength/ density ratio, hence where the self-weight of the structure is important, foundation loads are decreased and section size can be reduced.

iii. Other mechanical properties improve with strength for example stiffness impact resistance.

iv. Permeability and carbonation rates are reduced so durability should enhance.

v. More suite to hostile marine environment.

Figure 20: High Performance Concrete Example

2.3.5 Pre Stressed Concrete

Pre stressed concrete is a form of concrete used in construction which is 'pre- stressed' by being placed under compression prior to supporting any loads beyond its own dead weight. The compression is produced by the tensioning of high- strength 'tendons' located within or adjacent to the concrete volume and is done to improve the performance of concrete in service. Pre stressed concrete is used in wide range of building and civil structures where its improved performance can allow longer spans, reduced structural thicknesses and material savings compared to simple reinforced concrete. Typical applications include high- rise buildings, residential slabs, foundation systems, bridge and dam. In pre stressed concrete, the steel is tensioned by jacks and then released so that it imparts a compressive stress to those areas of concrete which in service would be in tension.

Two Basic Process

i. Pre – tensioning

Pre- tensioned concrete is a variant of pre stressed concrete where the tendons are tensioned prior to the concrete being cast. The steel is tensioned by jacks before the concrete is placed and then when the concrete is mature, the ends are released and the concrete pre stressed by the local bound

.

ii. Post- tensioning

Post- tensioning concrete is a variant of pre stressed concrete where the tendons are tensioned after the surrounding concrete structured has been cast. Duct are cast into the concrete usually in curved profile to give increased bending at the center and to help overcome shear stress at the ends of the beams. When the concrete is mature, tendons are inserted and stressed against the especially strength ends of the beam. They are locked in place and the ends release.

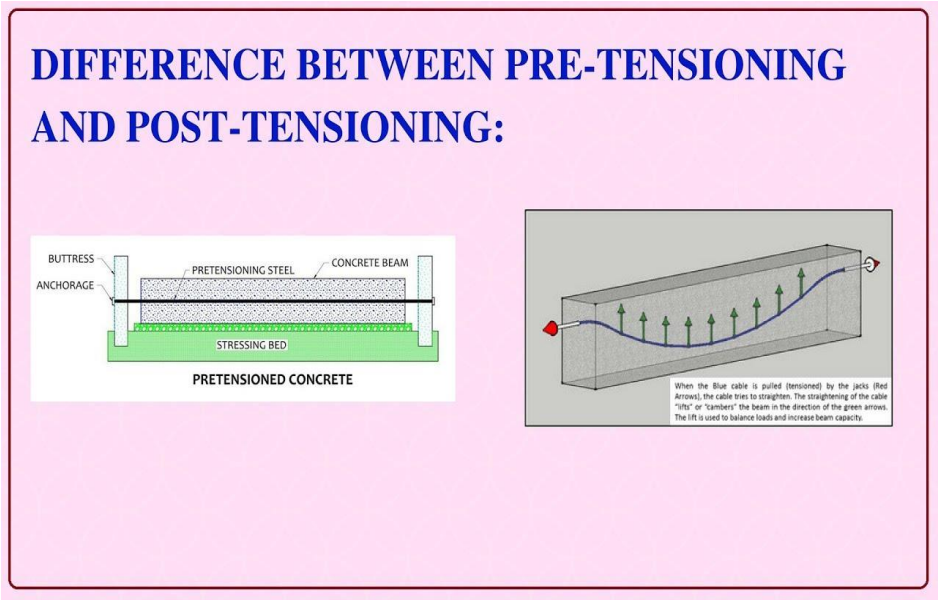


Figure 21: Difference between Pre-Tensioning and Post- Tensioning

2.3.6 The Type of Slump Test

The concrete slump test can be classified according to the nature of concrete fall. There are 3 types of the slump test:

i. True slump

In the true slump concrete just subsides shortly and more or less maintain the mould shape. This type of slump is most desirable.

ii. Shear slump

If one-half of the cone slide down in an inclined plan, it is called a shear slump. Shear slump indicated lack of cohesion in the concrete mix. Shear slump may occur in the case of a harsh mix.

iii. Collapse slump

In the case, fresh concrete collapses completely

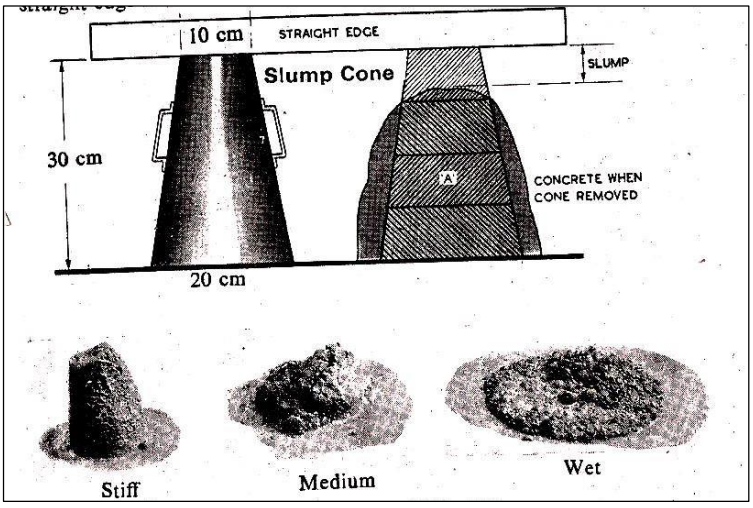


Figure 22: Type of Slump

2.4 SUMMARY

In conclusion, this chapter explains about the concrete works. Concrete works are divided in 5 types which is lean concrete, lightweight concrete, reinforced concrete, high strength concrete and pre stressed concrete. In this chapter also describe about the type of slump test that use in construction industry. Lastly, the explanation about this chapter mostly from internet, article and journal.

CHAPTER 3:
CASE STUDY
KLINIK KESIHATAN JENIS 6 DAN KUARTERS FELDA BERSIA, GERIK (HEALTH CLINIC TYPES 6 AND QUARTERS)

3.0 INTRODUCTION

This chapter explains about case study at Felda Bersia . In addition, it also tells about the studies that have been done in the case study related to the topic that selected namely are the cube test and slump test. This project is to build Klinik Kesihatan (Jenis 6) Dengan Kuartes (Health Clinic types 6 and Quarters) Felda Bersia, Daerah Hulu Perak, Perak Darul Ridzuan.

I am very thankful to be able to prepare a study on the help and guidance of the site supervisor and person in at technical department as well as assistant engineer. All this information was I collected it comes from my research and interview of experienced people.

3.1 DESCRIPTION OF BUILDING

The building name is *Klinik Kesihatan Jenis 6 dan Kuartes* which is located at Felda Bersia, Daerah Hulu Perak. The construction was started 12.09.201 and is expected this project will complete by 12.03.2019. The component that consists of building are klinik kesihatan, garbage house, electric sub-station, quarters and guard office. The project value is RM 8,993,939.90 and the defect liability period is 12 months start after the project was complete. Besides, the area of site is 4.132 ha while the construction area is 10.210 ek.

3.2 SITE BACKGROUND

Title of contract : Klinik Kesihatan (Jenis 6) dengan Kuaters (2F/2G) Di Felda Bersia, Daerah Hulu Perak, Perak Darul Ridzuan

Official Ruling : Pejabat JKR Daerah Hulu Perak

No of contract : PERS/ PK / 752 / 2017

Contractor name : Arsinar SDN.BHD

Contractor Address : No 17 A, Jalan Tokong, 31650 Ipoh, Perak Darul Ridzuan

Tel: 05- 5451480 / 012- 5394867

Grade : CIDB 'Gred 6'

Taraf : Bumiputera

Contract Period : 78 week

Date of possession of site: 12.9.2017

Expiry Date of Contract : 12.3.2019

Contract Value : RM 8,993,939.90

Defect Liability Period: 12 months

3.2.1 SITE LOCATION

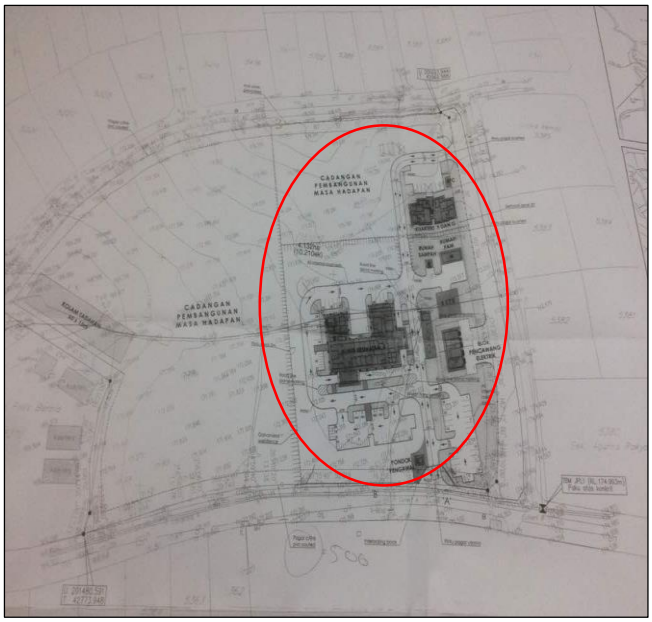


Figure 23: Location Plan at Case Study

3.2.2 KEY PLAN

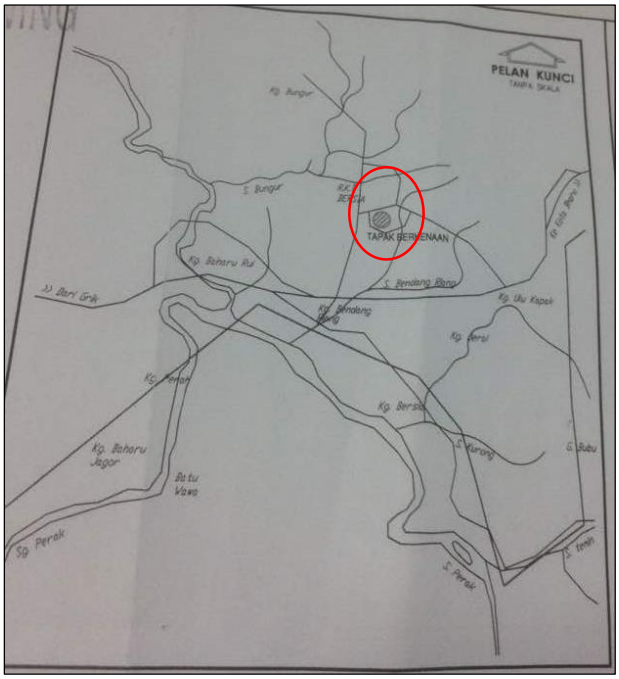


Figure 24: Key Plan of Case Study

3.3 ORGANIZATION CHART OF CLIENT

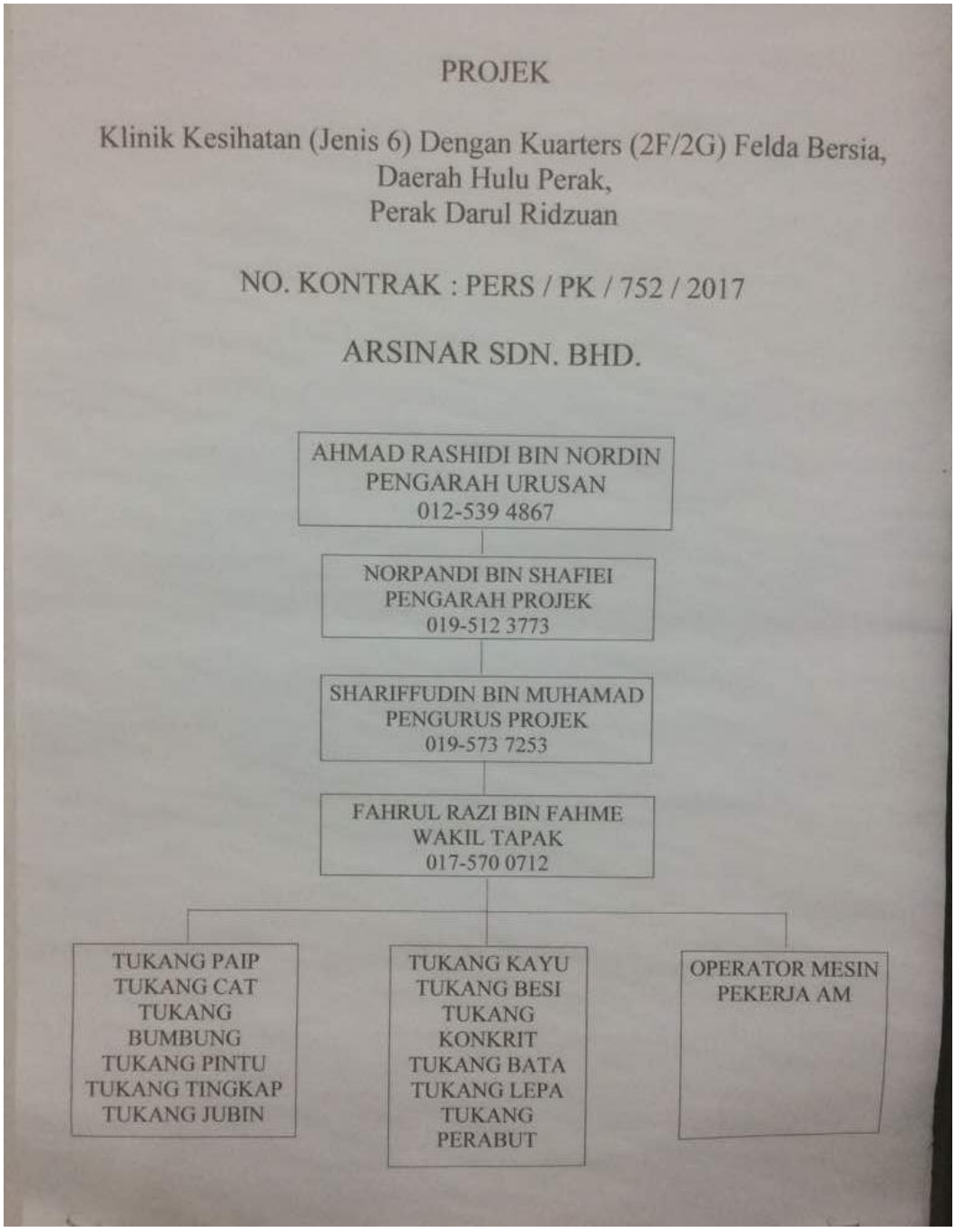


Figure 25: Organization of Client

3.4 CONCRETE WORKS

Concrete works have divided into 2 types which is slump test and cube test. The concrete slump test is a one of test that usually conducted to measure workability of fresh concrete. Besides, concrete cube test is a test conducted to determine the strength of concrete

3.4.1 CUBE TEST

Methodology of Cube Test

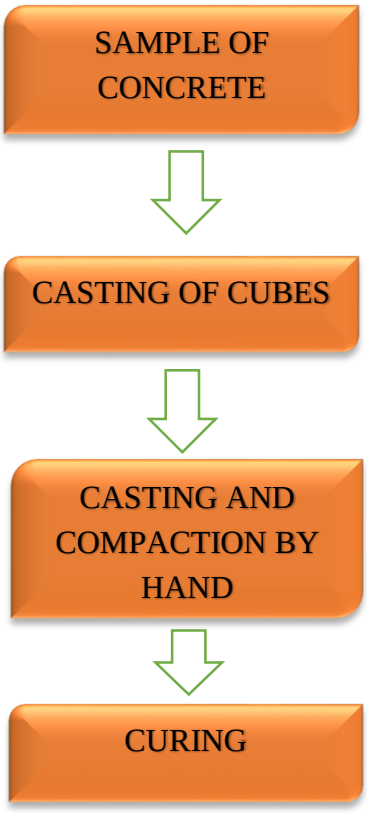


Figure 26: Methodology of Cube Test

3.4.2 Procedure of Cube Test

i. Sample of Concrete

Firstly, sample of concrete for test shall be taken at the ready mixed concrete from the transportation vehicle at the time of discharge. The sample obtained shall be mixed on non – absorbent base with shovel until it is uniform in appear.

Figure 27: Sample of Fresh Concrete

i. Casting of Cubes

The cube mould plate should be removed and have properly cleaned assembled and all the bolt should be fully tight. A thin layer of oil then shall be applied on all the faces of the mould. It is important that cube side faces must be parallel. This ensure that the concrete does not stick to the mould and make it easy to remove the cube.

Figure 28: The Mould at Site

ii. Casting And Compaction By Hand

The concrete sample shall be filled into the cube moulds in 3 layers, each layer approximately 5 cm deep. In placing each scoopful of concrete, the top edge of the mould as the concrete slides from it. Each layer of the concrete shall be compacted by hand. Each layer of the concrete filled in the mould shall be compacted by not less than 35 strokes by tamping bar. The strokes shall be penetrating into the underlying layer and bottom layer shall be rodded throughout its depth. After pouring, level the top surface and smoothen it with a trowel. Prepare the 6 mould filled the concrete with the same manner.

Figure 29: Level the Top Surface of Cube

iii. Curing

The test specimen are stored in moist air for 24 hours and after this period of specimens are marked and removed from the molds, kept submerged in clear water until taken out to test. The water should tested every 7 days and the temperature of water is 27+- 20C.

Figure 30: The Curing Process

3.5 SLUMP TEST

3.5.1 Methodology of Slump Test

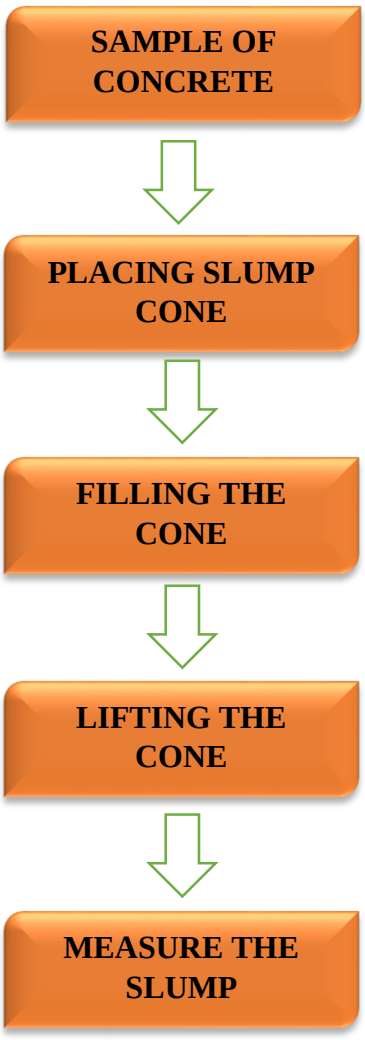


Figure 31: Methodology of Slump Test

3.5.2 Procedure of Slump Test

i. Sample of Concrete

Firstly, sample of concrete for test shall be taken at the ready mixed concrete from the transportation vehicle at the time of discharge. Place the wheel barrow below the chutes to get the fresh concrete and avoid overfilling in the wheelbarrow. The engineer will check the delivery note to make sure the concrete are compliance with the concrete grade required.

Figure 32: The Apparatus of Slump Test

Figure 33: Sample Fresh Concrete

ii. Placing The Slump Cone

After that, mix the concrete using the shovel or concrete scoop. Do it again until the concrete in the wheelbarrow is properly mixed. Before placing the slump cone, make sure the slump table are damp. Place the slump table on the level and stable ground and make sure it will not vibrate when placing the concrete. Place the slump cone on the slump table.

Figure 34: Placing the Slump Cone

iii. Filling The Cone

Fill the cone with concrete to 3 equal height in turn, after pouring the first layer it must be rodded 25 times with rounded steel. Then, fill the cone again for the second layer and do rodding as first layer. For the three layer, make sure that the cone is completely filled the concrete. Rod the 25 times and make sure that the rod just penetrates the surface of the preceding layer.

Figure 35: Pouring Process

Figure 36: The Rodding Process

iv. Lifting The Cone

Before lifting the cone, it is important to make that the table around the cone is clean. Besides, remove the concrete debris. While cleaning, the foot pressured on the cone and cannot be moved . Then, the cone are fully lifted straight.

Figure 37: Finished the Pouring

Figure 38: Lifting of Slump from Cone

v. Measure The Cone

The slump test is measured by placing the cone. Place the upturned cone just beside the slump concrete and lay the rod above it, then measured the slump underside of the rod to the topmost portion of the concrete.

Figure 39: Measured of Slump Test

3.6 THE TYPE OF CONCRETE USE AT SITE

At our case study, Klinik Kesihatan Jenis 6 (KK 6) there several different type of concrete that had applied at site.

i. Reinforced concrete

This type of concrete is the most use at site such as area clinic and TNB house. Specification of reinforcement that use was decided by architect.

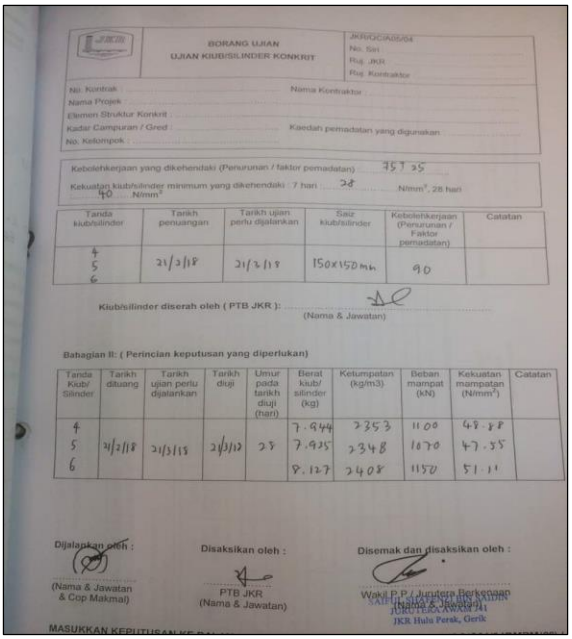
Figure 40: Reinforced Concrete at Site

ii. Lean concrete or lean conc

Lean concrete that use at site basically 50 mm thickness. This use at foundation, ground beam and other for avoid moisture or chemical in soil like sulphates that may attack concrete.

Figure 41: The Lean Concrete Use at Case Study

3.7 RESULT OF CUBE TEST AND SLUMP TEST



BORANG UJIAN
UJIAN KIUB/SILINDER KONKRIT

Tanda kiub/silinder	Tarikh penuangan	Tarikh ujian perlu dijalankan	Saiz kiub/silinder	Kebolehkerjaan (Penurunan / Faktor pemadatan)	Catatan
4 5 6	21/2/18	21/3/18	150x150mm	90	

Kiub/silinder diserah oleh (PTB JKR): (Nama & Jawatan)

Bahagian II: (Perincian keputusan yang diperlukan)

Tanda Kiub/ Silinder	Tarikh dituang	Tarikh ujian perlu dijalankan	Tarikh diuji	Umur pada tarikh diuji (hari)	Berat kiub/ silinder (kg)	Ketumpatan (kg/m3)	Beban mampat (kN)	Kekuatan mampatan (N/mm²)	Catatan
4					7.944	2353	1100	48.88	
5	21/2/18	21/3/18	21/3/18	28	7.935	2348	1070	47.55	
6					8.127	2408	1150	51.11	

Dijalankan oleh : (Nama & Jawatan & Cop Makmal)

Disaksikan oleh : PTB JKR (Nama & Jawatan)

Disemak dan disaksikan oleh : Wakil P.P / Juruteru Berkenaan (Nama & Jawatan) JURUTERA AWAM (A) JKR Hulu Perak, Gerik

MASUKKAN KEPUTUSAN KE

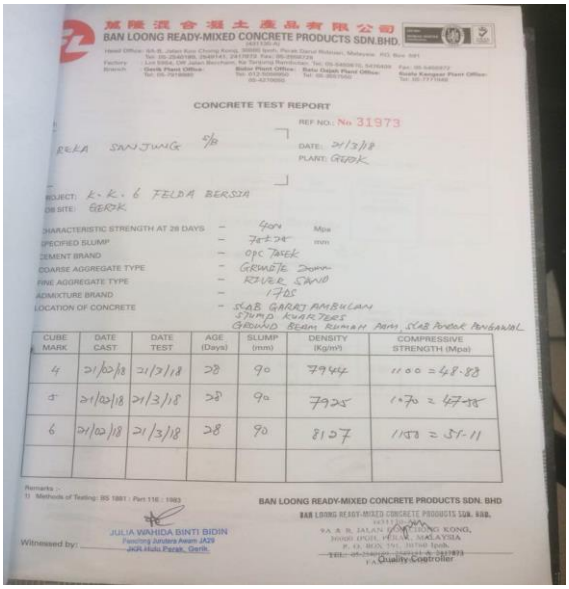
Figure 42: The Result Cube Test

The workability of concrete (decreased / compaction factor) that should be 75+ - 25. If the workability of concrete decreased that 75 mm the concrete shall not use in the construction. In this test strength of cube minimum in 7 days is 28 N/mm^2, 28 days is 40N/mm^2. Every test cube that be tested must approved by engineer at site. The cube test have 3 different time which is at 7, 14 and 28 days for test. Besides, after pouring the cube in 7 days, the company of supplier will do the test at their lab. The table below for cube 4, 5 and 6.

Mark of cube /cylinder	Date of pouring	Date test be tested	Size of cube /cylinder	Workability (compaction factor/ decrease
4 5 6	21/2/18	21/2/18	150 x150 mm	90

Mark of cube /cylinder	Date of pouring	Date test be tested	Date of test	Age date test be tested	Weight cube /cylinder (kg)	Density	Load compaction	Strength compaction
4 5 6	21/2/2018	21/3/2018	21/3/2018	28	7.944 7.925 8.127	2353 2348 2408	1100 1070 1150	48.88 47.55 51.11

Table 2: The result of cube test


BAN LOONG READY-MIXED CONCRETE PRODUCTS SDN.BHD.

CONCRETE TEST REPORT

REF NO.: No 31973

DATE: 21/3/18

PLANT: GERIK

PROJECT: K-K-6 FELDA BERSIA

JOB SITE: GERIK

CHARACTERISTIC STRENGTH AT 28 DAYS – 40N Mpa

SPECIFIED SLUMP – 75±25 mm

CEMENT BRAND – OPC TASEK

COARSE AGGREGATE TYPE – GRUMBTE 20mm

FINE AGGREGATE TYPE – RIVER SAND

ADMIXTURE BRAND – 1705

LOCATION OF CONCRETE – SLAB, GARAJ, PAMBUCAN, JAMU QUARTERS, GROUND BEAM RUMAH PAM, SLAB PONDOK PENGAWAL

CUBE MARK	DATE CAST	DATE TEST	AGE (Days)	SLUMP (mm)	DENSITY (Kg/m³)	COMPRESSIVE STRENGTH (Mpa)
4	21/02/18	21/3/18	28	90	7944	1100 = 48.88
5	21/02/18	21/3/18	28	90	7925	1070 = 47.55
6	21/02/18	21/3/18	28	90	8127	1158 = 51.11

Remarks :
1) Methods of Testing: BS 1881 : Part 116 : 1983

Witnessed by: JULIA WAHIDA BINTI BIDIN, Pembina Jurutera Awam (A29), JKR Hulu Perak, Gerik

BAN LOONG READY-MIXED CONCRETE PRODUCTS SDN. BHD

Quality Controller

Figure 43: The Result of Slump Test

Characteristic strength at 28 days	Specified slump	Cement brand	Fine aggregate type	Coarse aggregate	Location of concrete
40 N/mm²	75+-25	OPC Tasek	Granite 20mm	River sand	Stump quarters ,ground beam

Cube mark	Date cast	Date test	Age (days)	Slump	Density	Compressive strength (Mpa)
4	21/2/2018	21/3/2018	28	90	7944	48.88
5	21/2/2018	21/3/2018	28	90	7925	47.55
6	21/2/2018	21/3/2018	28	90	8127	51..11

Table 3: the result of slump test

Degree of workability	Slump (mm)	Use for which concrete is suitable
Very low	0-25	Very dry mixes: used in road making. Roads vibrated by power operated machines
Low	25-50	Low workability mixes: used for foundations with light reinforcement. Roads vibrated by hand operated Machines
Medium	50-100	Medium workability mixes: manually compacted flat slabs using crushed aggregates. Normal reinforced concrete manually compacted and heavily reinforced sections with vibrations
High	100-175	High workability concrete: for sections with congested reinforcement. Not normally suitable for vibration

Table 4: Degree of Workability

The slump test measured the consistency of the concrete and indicates about the variation in the ingredients. The slump test that had been tested in the construction site is true slump. The degree of workability is medium which is 90 mm.It is very suitable for the construction slab and stump. If the degree of workability is under 75 mm, the assistant engineer at construction will not approve the concrete.

3.8 SUMMARY

In summary for chapter 3, it can be conclude that chapter 3 explain about our case study. Then, this chapter also explain with detail about case study selected such as site background, site location, and key plan. The most important part in chapter 3 is procedure of concrete works and methodology of works about slump test and cube test. Moreover, chapter 3 also discuss about the data result of slump test and cube test.

CHAPTER 4:

PROBLEMS AND RECOMMENDATION

4.0 INTRODUCTION

In this chapter which is focusing about the problem and finding recommendation about the chapter 3 which is case study. This chapter also focusing how to solve the problem that occurred in chapter 3 about weather condition and company management. The objective of problem recommendation is to make the project complete before due date and avoid extension of time.

4.1 PROBLEMS AND RECOMMENDATION

Based on the experienced while I training at site there a few problem occur at site include:

PROBLEM

Company management

Based on observation and study at case study, the problem that occur is company management. It is because supplier of ready mixed concrete always get one transportation. While the transportation should have 3 to make the construction activity smooth.

RECOMMENDATION

To overcome this problem, I suggest that the company management must find or make a good selection of material such as ready mix concrete based on the experience of project before.

PROBLEM

Weather condition

The second problem that occur at our site due to the condition weather, unpredictable weather caused construction can be abandoned because concreting.

RECOMMENDATION

To solve this problem, I proposed to do overtime. For example, at site have frequently heavy rains at morning. Then, overtime should be done at evening so that company can deal with concrete supplier. Hence, the project with complete within concrete

5.0 CONCLUSION

5.0 CONCLUSION

As the conclusion, I can conclude there are many good effect and information that I had get from this training report. Training report is very important for the subject BSR 360 which is practical training. In chapter 1, it explained the introduction of the building that I had been practical. It also describe the mission and vision of the PWD that want become world class services provider. The location of the PWD Hulu Perak had been stated in chapter 1 on this report. The history of the building had explained. That the main building at Gerik and the sub-building at Lenggong and Pengkalan Hulu.

Besides, for chapter 2 can conclude this chapter explained about the literature review. The sources for literature review is from the magazines, book, journal, articles and internet. In chapter 2 also describes detail definition about slump test, cube test and concrete. Then, there so many sources can get from internet and article about the slump test and cube test.

In addition, the chapter 3 had related with case study. The case study was located *Felda Bersia Lama, Gerik, Perak.* Moreover, the case study is about the concreting works which is slump test and cube test. This chapter also stated the case study background, location maps and the organization chart at site. The site supervisor help with give the detail information about the process of slump test and cube test. the process for the slump test and cube had to be tested after 28 days pouring process.

In the nutshell, the overall conclusion for the report slump test indicates the behavior of compacted concrete. The test to measure the workability of concrete at the site. It also to ease the concrete flow for the construction. The test used the simply equipment and have a procedure. The increased of pressure on the concrete mean the high workability of that concrete. The cube test is to measure the strength of concrete. It also to measure the consistency of the concrete. The cube test need to curing for chemical reactions to proceed continuously. From the result it can conclude the strength of the concrete increased with age.

REFERENCES

- According to Puan Julia Watie, Penolong Jurutera Jabatan Kerja Raya Hulu Perak on 31 May 2018
- Procedure slump test, retrieved from http:///www.qualityengineersguide.com/how-to-do-slump-test-concrete and https://civilseek.com/concrete-slump-test/ on 23 May 2018
- Types of slump test, retrieved from https://civilseek.com/concrete/slump/test/, on 12 May 2018
- Definition of concrete, retrieved from https://en.m.wikipedia.org/wiki/Concrete, on 28 March 2018
- Definition of cube test, retrieved from https://www.quora.com/what-is-a-concrete-cube-test and https://en.m.wikipedia.org/wiki/comprossive_strenght on 12 May 2018
- Methodology of work (cube test) retrieved from https://www.eaasymixconcrete.com/news/concrete-cube-test/ on 23 May 2018
- Organization background retrieved from hup.jkrperak.gov.my on 24 March 2018

- High strength concrete, retrieved from https://www.sika.com.en/solutions_product/highstrengthconcrete.h tml) on 20 May 2018
- Pre stressed concrete, retrieved from (https://en.m.wikipedia.org/wiki/prestressed_concrete) on 20 May 2018