



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

**POST CONCRETE WORK**

**Prepared by :**

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(PERAK)**

**DECEMBER 2019**

It is recommended that the report of this practical training provided

**By**

**Amir Hamzah Bin Rashid Ridha**

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**Entitled**

**Post Concrete Work**

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

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**(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 Setiakon Builders 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 a partial fulfillment of the requirements for obtaining the Diploma in Building.

Name : Amir Hamzah Bin Rashid Ridha

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Date :

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Thank you so much.

## **ABSTRACT**

Post concrete was a very important part in construction, therefore this report will discuss about the sequence work of post concrete after the casting work and removal of formwork. This report was conducted for 48-storey office tower located at Jalan Imbi, Bukit Bintang. The objective of this report is to know the sequence work of post concrete, identify concrete problem on site and to know the rectification work for post concrete. To ensure the quality of the concret and avoid any incident cause by poor concrete condition in the future. This report will explain the right procedure of post concrete work and what kind of defect on concrete that usually appeared after the removal of formwork.

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## CHAPTER 1.0

### INTRODUCTION

#### 1.1 Background and Scope Of Study

The study has been conducted for this report is carried out in a construction site at Pedoman Cekap Cluster C, Bukit Bintang. It is located at Section 67, Jalan Delima, Jalan Utara And Jalan Kemuning, Federal Territories Of Kuala Lumpur. Pedoman Cekap Sdn Bhd is the devoleper while Setiakon Builders as the main contractor for the project. The project costs RM 168,800,000.00 based on the contract. Figure 1.1 below shos the location of the construction site.

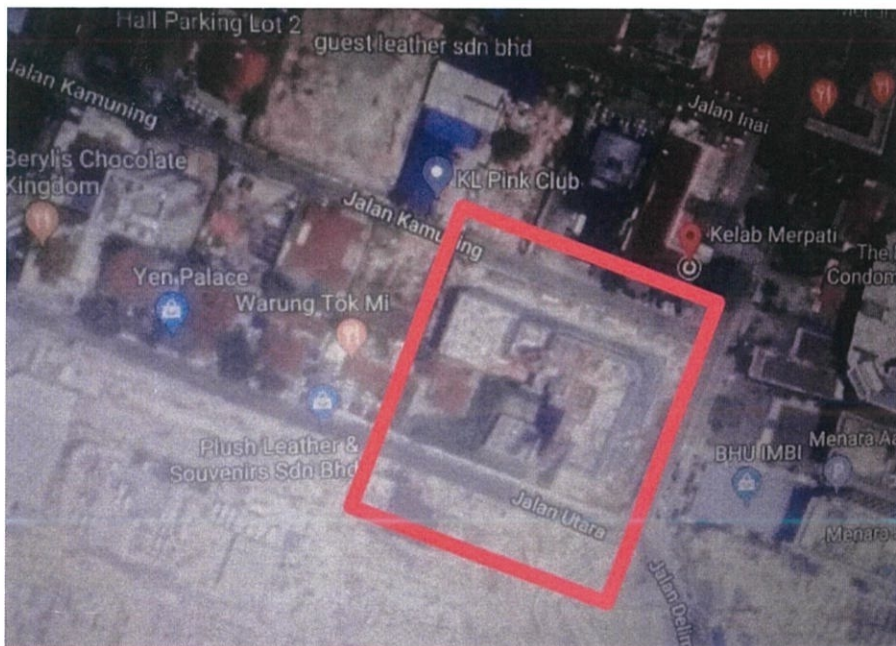


Figure 1.1: Location of the construction site

(source: Google Map)

## **1.2 Objective**

- 1.2.1 To identify the sequence work for post concrete
- 1.2.2 To identify defects on site
- 1.2.3 To determine the method of rectification work for post concrete

### **1.3 Scope Of Study**

This report was made based on 'Propose Development Of 48-Storey Office Block At Section 67, Jalan Delima, Jalan Utara And Jalan Kemuning, Federal Territories Of Kuala Lumpur' For Pedoman Cekap Sdn. Bhd. This report will mainly focus on Post Concrete work after the removal of formwork.

The study are based on sequence work for post concrete starting form removal of formwork, inspection, rectification work and signed off inspection form by C.O.W. Post Concrete work are to ensure the quality of the concrete and to prevent any damage because of poor condition of concrete.

#### **1.4 Research Method**

1. Observation – Observation was made when carry out the inspection for post concrete work, rectification work and site walk.
2. Interview – interview happen during the period of observation and when review document for post concrete work. Interview during the observation happen with the QAQC engineer, Puan Aima Fareha who have 6 years worth of experience in QAQC course. The interview while review the document QA&QC engineer Nur Aima Fareha and QAQC excecutive Nur Syamimi.
3. Document Review – Several document was used as an guide at site and also to learn the procedure of post concrete, detail for the rectification work and defects that usually appear when casting done.

## **CHAPTER 2.0**

### **COMPANY BACKGROUND**

#### **2.1 Introduction of Company**

Setiakon is a leading contractor in Malaysia with a completed and current portfolio of residential, retail, healthcare, institutional, commercial, industrial and infrastructural projects. Setiakon was established on 12 December 1994. Setiakon Builders Sdn Bhd (Setiakon) started off as a sub-contractor in the building industry, focusing on civil engineering and infrastructure works 20 years ago. Setiakon is controlled by its directors Datuk Kuan Ah Hock and Tan Tong Kwee.

Over the years, the company has grown from strength to strength and have successfully completed many notable mega projects. Some of the notable projects completed were Putrajaya's Dataran Putra, Customs, Immigration & Quarantine complex at Tanjung Kupang Johor and Kuala Lumpur Flood Mitigation. Each project is managed by a team of highly experienced personnel.

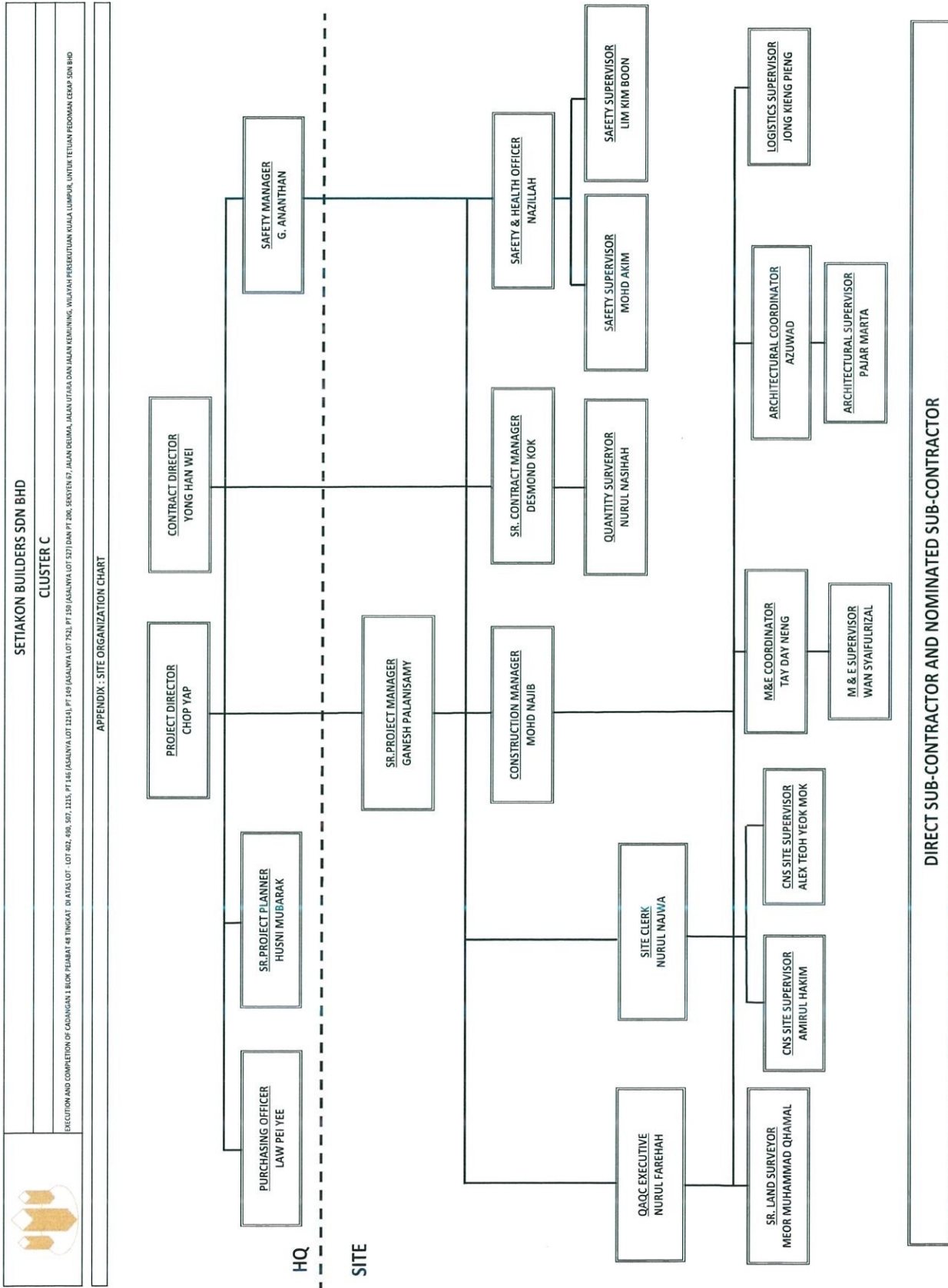
Due to having completed billions of ringit worth of projects, Setiakon have proven as the trusted construction company that keeps client's projects progressing smoothly and safely. With a strong belief and conviction in the construction industry, Setiakon have become a leading main contractor specialising in high rise construction in Malaysia.

## 2.2 Company Profile

Table 1.1: Company profile

<b>NAME OF COMPANY</b>	SETIAKON BUILDERS SDN. BHD
<b>HEADQUARTER ADDRESS</b>	13, Jalan Cempaka SD 12/1, Bandar Sri Damansara, 52200 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur
<b>DIRECTORS</b>	<ul style="list-style-type: none"> <li>• DATO' KUAN AH HOCK</li> <li>• MR TAN TONG KWEE</li> </ul>
<b>ESTABLISH DATE</b>	12 December 1994
<b>VISION</b>	To be one of the most distinguished building solution providers in Malaysia and the region.
<b>MISSION</b>	To build quality, efficient and conducive environment that fulfils people's dreams, aspirations and vision for a better world.
<b>OBJECTIVE</b>	<p>To ensure customers satisfactions by delivering construction work of the highest standard in a cost-effective and timely manner.</p> <p>To deliver quality and productivity by consistently raising our capabilities and professionalism.</p> <p>To provide forward-looking construction solutions to meet our client's requirement and needs.</p>
<b>NO. TEL &amp; FAKS</b>	NO. TEL: NO. FAKS:
<b>WEBSITE</b>	<a href="https://easytest.my/setiakon/home">https://easytest.my/setiakon/home</a>
<b>EMAIL</b>	<a href="mailto:info@setuakon.com.my">info@setuakon.com.my</a>
<b>GRADE</b>	<ul style="list-style-type: none"> <li>• G7 – (B) BUILDING</li> <li>• G7 – (CE) CIVIL ENGINEERING</li> <li>• G7 – (ME) MECHANICAL &amp; ELECTRICAL ENGINEERING</li> </ul>

## 2.3 Organization Chart



## 2.4 List Of Project

Over the years, Setiakon Builders Sdn. Bhd. Have manage to completed a lot of projects. There are many project like infrastructure, residential and commercial building that have been successfully constructed by Setiakon Builders Sdn. Bhd.

Table 1.2: Completed Projects

<b>PROJECTS</b>	<b>PROJECT VALUE</b>	<b>COMPLETION DATE</b>
1) Main Building Works For Cadangan Bercampur 36 Tingkat Di Atas Lot 34669 1/155B, Bukit Jalil, Mukim Petaling, Kuala Lumpur.	RM 260,898,000.00	JULY 2017
2) Bangunan Kediaman Pangsapuri mewah Di Atas Lot 1578, Jalan Dutamas Raya 1/38B, Mukim Batu, Wilayah Persekutuan Kuala Lumpur Untuk Tetuan BTHomestead Development Sdn Bhd.	RM 100,00,00.00	MAR 2017
3) Main Building Work For Cadangan Pembangunan Bangunan Perniagaan 29 Tingkat Di Atas Lot H.S (D) 287223(PT24), Seluas 3.82 Ekar, Tropicana Metropark, Subang Jaya, Pekan Country Height, Mukin Damansara, Daerah Petaling, Selangor Darul Ehsan For Tropicana Metropark Sdn Bhd (Phase IC-Paloma).	RM 212,688,000.00	JUN 2017
4 ) Proposed Comercial Development At Jalan Ampang Ulu 3, Ampang, Kuala Lumpur For Rubber Smallholder Development Authority (RISDA).	RM 277,500,000.00	JUN 2018
5 ) Cadangan Pembangunan Perniagaan Bersirata Bagi 25 Tingkat Ruang Pejabat (sovo), 25 Tingkat pangsapuri Perkhidmatan Dan Ruang Perniagaan Serta Kemudahan Di Sungai Buloh Sentral, PT 4629, Jalan Welfare, Kampung Baru Sungai Buloh, Seksyen U19, Shah Alam, Selangor Darul Ehsan (Dsara sentral – Package 1)	RM 376,747,560.00	NOV 2017



There are few of projects that still ongoing construction :

Table 1.3: Current Projects

<b>PROJECTS</b>	<b>PROJECT VALUE</b>	<b>COMPLETION DATE</b>
1 ) Propose Development Of 48-Storey Office Block At Section 67, Jalan Delima, Jalan Utara And Jalan Kemuning, Federal Territories Of Kuala Lumpur For Pedoman Cekap Sdn. Bhd.	RM 168,800,000.00	JUN 2020
2 ) Cadangan Membina Pembangunan Perniagaan Di Atas Lot 212 Dan Lot 213, Persiaran Tropicana, PJU 3, Mukim Damansara, Daerah Petaling, Selangor Darul Ehsan.	RM 120,350,728.51	NOV 2020
3 ) Cadangan Membina 2 Blok Pangsapuri Perkhidmatan 37 Tingkat (1018 Unit) Di Atas Lot 80916 (sebelumnya lot 47222) Dan Sebahagian Lot 32661, Jlan Segambut, Mukim Batu, Wilayah Persekutuan Kuala Lumpur Untuk Tetuan 368 Segambut Sdn Bhd.	RM 188,000,000,00	JUL 2020

## CHAPTER 3.0

### CASE STUDY

#### 3.1 Introduction to Case Study

Pedoman Cekap Cluster C is an on-going construction project at Jalan Kemuning, Bukit Bintang, Kuala Lumpur. The construction site located beside Tun Razak Exchange (TRX). It is located on a very strategic location, as it near to the access road Jalan Tun Razak, and near the public transportation hub which is MRT (TRX) laluan Sungai Buloh-Kajang,. Moreover, it is near to shopping mall such as Paradigm Mall, Sogo, Low Yat and Pavillion.

The project applied in-situ casting method for the whole construction project. The building consists of reinforced concrete for structural works. All the casting works are monitored with supervisors . This report is focused on post concrete work after the casting work done.

This project propose to Execution And Completion Of Recommendations 48 Storey of office block with:

- I. 1 Level Space Podium, Trade Room(Level 1) And Management Office Room (Mezzanin Level),
- II. 1 Level of M&E Trading Space (Level 2),
- III. 8 Level Podium For Car Park (Level 3 to Level 10),
- IV. 1 Levels of Reservoir Room (Level 11),
- V. 3 Level of Private Club (Level 12 to Level 13A),
- VI. 33 Level Of Office Space (Level 15 to Level 47) And
- VII. 1 Basement Car Park

At Section 67, Jalan Delima, Jalan Utara And Jalan Kemuning, Federal Territories Of Kuala Lumpur For Pedoman Cekap Sdn. Bhd.



Figure 3.1.1: View of the building construction



Figure 3.1.2: View of podium

### 3.2 Procedure of post concreting work.

The purpose of this procedure is to outline sequence of activities for post concrete works which are inspect and determine the defects to be rectified upon removal of formwork, records preparation, rectification as per the agreed method and reinspection for signing off.

These describes the construction method to set up the right procedures and planning for all concrete rectification works by identifying suitable method and based on types of post concrete problem in accordance with the contract specifications and manufacture recommendation.

Site team and QAQC department shall take responsible to identify correction and preventions for all type of defect in order to minimise poor quality of structure at site and shall take necessary actions.

#### 1.) Upon Removal Of Formwork

After removal of formwork and housekeeping done, safety team will inform QAQC (quality assurance and quality control) team for post-concreting work. QAQC team will began the inspection for post-concreting work and inform the COW (clerk of work) via RFI (request for inspection) form. COW must be informed first because they will join for the inspection. The RFI form must be attached with post concreting inspection form and layout drawing for the inspection.

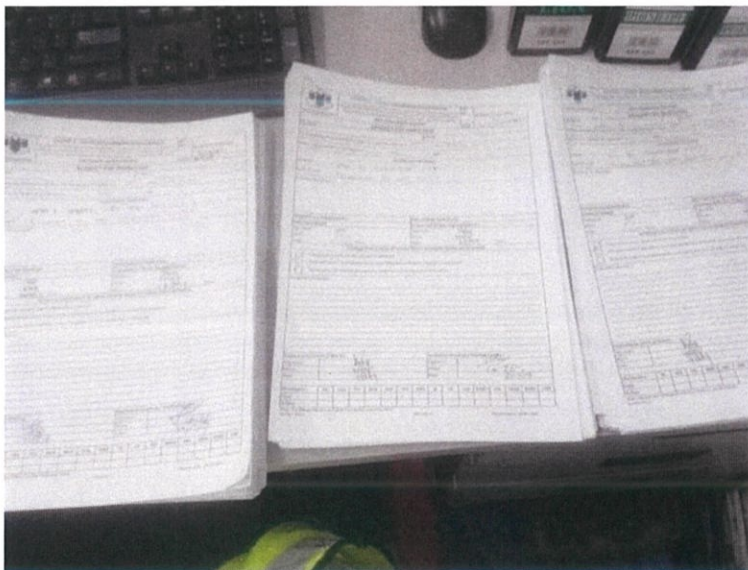


Figure 3.2.1: RFI (Request For Inspection) Form

## 2.) Carry out Post-Concreting Inspection

The inspection will be join with COW and QAQC team. The purpose of the inspection to identify defects that happened after the formwork have been removed. The example of the defects is honeycomb, uneven surface and cement slurry. During the inspection, QAQC team represent will record the defects in post concrete form, mark the defect location on the layout and take photograph of the identify defects to be record as 'PHOTO BEFORE'. Once the inspection finished, QAQC team will prepare report of photograph as 'PHOTO BEFORE' to be attached with inspection form to compare with 'PHOTO AFTER'.



Figure 3.2.2: Inspection for identify crack with QAQC engineer and C.O.W

## 3.) Rectification Work

After the inspection have been carry out, QAQC Team, Site Team and Subcon will discuss the method of the rectification work as per approved method of statement. Method statement must be discussed and send to consultant for approval method of statement and proceed works. The rectification work shall not proceed without approved method of statements.

Once the method of statement has been approved, workers will start the rectification work based on the method of statement.

When the rectification work done, QAQC team representative will first inspect the work completed by the workers to make sure the works follow the method and reach their

satisfactory, then request joint inspection from COW to check the work and signing off the post-concrete form.

Once work accepted by COW, 'PHOTO AFTER' (photo defects after rectify) will be taken to be recorded. If the work are not accepted by COW during the inspection for signing of due to minor unsatisfactory finishes or works, the rectification will be redo followed by COW comments.

#### **4.) Form Signed Off**

Signed off inspection form shows COW satisfaction and approved the rectification work. For signed off the post concreting form, photograph of 'PHOTO AFTER' shall be prepared to be attached with inspection post concreting form before COW signed off and QAQC team will copy one set of the form for their record.

### 3.3 Concrete Problems Found At Site

Inspection of concrete is essential to check for any damage or defects that may require repair. Immediately after removal of the form work all concrete members casted are carefully inspected to ensure the defects.

There are various types of defects on the concrete;

Table 1.4: Types of Defects

NO	DEFECTS	CASE	DESCRIPTION	TREATMENT	MATERIAL
1)	Honeycomb	1A	Surface defect defect from 5mm to 50mm	Patching	Sika Grout 215
		1B	Surface defect until exposed rebars	Presurre Grouting	Sika Grout 215
2)	Crack	2A	Hairline crack surface	Patching	Sika Grout 215
		2B	Surface cracks with over <b>0.30mm</b> (for crack with shallow depth)	Pressure Injection	Sikadur-52 MY Sikadur-31 CF Normal
		2C	Severa cracks with water seepage	Pressure Injection	Sikadur-52 MY Sikadur-31 CF Normal
3)	Loose material	3A	Remove loose material such as tie rod, nail, wire, sponge etc	Patching	Sika Grout 215
4)	Alignment out / Uneven surface	7A	Surface defect from 25mm to 50mm	Patching	Sika Grout 215
5)	Cement Slurry	5A	Surface defect look bad	Patching	Sika Grout 215

### 3.4 Carry Out The Rectification Work

Before started the rectification work, ensure the safety factor surrounding work place have been conducted. Make sure working platform, machinery and material are properly designed and safe to use. The perimeter of the area to be repaired must be cut using grinder to ensure the depth of break-out in the edge of any affected surfaces are minimum and feather edge are not formed. This preparation must be conducted to make sure the exposed concrete free from dust, loose particles and any damage matter.

Structural defect remedial work as follow :

#### 3.4.1 Honeycomb



Figure 3.4.1: Bad Honeycomb

**Case 1A** - Surface defect from 5mm to 50mm (which don't expose the concrete behind the reinforcement)

- I. All loose concrete at honeycomb area must be cut off and chip away until sound concrete is met. Chiselling out the affected area using chisel to exposed the sound concrete.
- II. All loose material will be removed by washing with water or with the aid of air compressor and leave the surface in rough condition.
- III. If the honeycomb area is small in extent and depth does not significantly effect the quality of the cover concrete that protecting the reinforcement, then it can be repaired by patching with **sika grout 215**.



**Case 1B - Surface defect which expose the concrete behind the reinforcement**

- I. When the reinforcement is encountered and the concrete behind the reinforcement was exposed, the depth of the exposed area must be deepened at least 25mm beyond the steel reinforcement for the reception of the repair mortar.
- II. Cut off and chip away all loose concrete at honeycomb area until sound concrete is met. Chiselling out the affected area to exposed sound concrete. The area will be repaired using pressure grouting with cementitious non shrink grout.
- III. All loose material will be removed by washing with water or with the aid of air compressor and leave the surface in rough condition
- IV. Install the formwork around the area, The formwork shall be tight enough to prevent grout loss during the grouting works. This is to ensure that all the void filled up with sika grout 215.
- V. Started to apply sika grout 215, where all chipping mix or suitable aggregate is required if the honeycomb is very severe and application must be done in accordance to manufacturer's instructions. Make sure the grout have sufficient fluidity to allow it to be poured to its final position to achieve good compaction and have low sedimentation.
- VI. After 48 hours, the formwork will be removed in order to ensure the grout has adequately set and completely hardened.



Figure 3.4.1 a): hacking remove loose material



Figure 3.4.1 b): pressure grout process

### 3.4.2 Crack

#### Case 2A – Hairline crack issue

- I. Clean and remove all dirt and loose materials on the prepared surface.
- II. Patch up the hairline area using **sika grout 215**.
- III. After the patching work, smooth the surface using grinder.

#### Case 2B – Surface crack with over 0.25mm (for crack with shallow depth)

- I. Saw cut / V cut along the crack lines to form V-groove of a width of 10mm and depth of 10mm or it may increase based on site condition using grinder.



Figure 3.4.2 a) Cutting V-Cut using grinder

- II. Clean and remove all dirt and loose materials on the prepared groove.
- III. Patch up the groove using **sika grout 215**.



Figure 3.4.2 b) Patch up work using sika grout 215

- IV. After the patching work is done, grind to smooth the surface using grinder.

**Case 2C - Surface crack with deep crack and crack through in Horizontal Slabs**

- I. Clean and remove all dirt and loose materials on the crack surface.
- II. For the crack that penetrating the slab through to the soffit, the underside of the slab must be sealed by epoxy mortar such as **sikadur-31 CF Normal** one day in advance before the application of **sikadur-52 MY**.

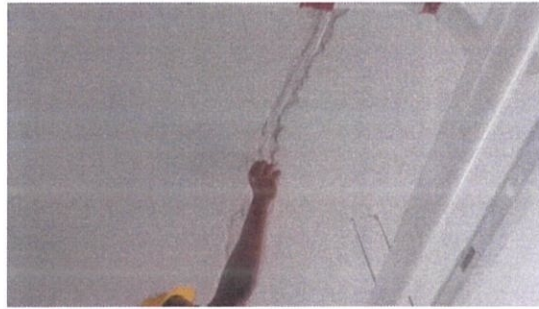


Figure 3.4.2 c) Apply epoxy mortar

- III. Drill at each 25cm besides the crack to set the injection port (packer) and make sure the crack between the injection port (packer) sealed by using sikadur-31 CF normal to prevent the injection resin to escape from the gap during the injection process.
- IV. Start the injection of mixed **sikadur-52 MY** as per manufacturer's recommendation into the crack through the injection port (packer) using a single injection pump



Figure 3.4.2 d) Injection work

- V. Once the injection process finished, the injection port (packer) will be removed as well as the sealing material between the injection port (packer).

-Surface crack with deep crack and crack through Crack in Vertical structures

- I. Clean and remove all dirt and loose materials on the crack surface.
- II. Drill at each 25cm besides the crack to set the injection port (packer) and make sure the crack between the injection port (packer) sealed by using **sikadur-31 CF** normal to prevent the injection resin to escape from the gap during the injection process.

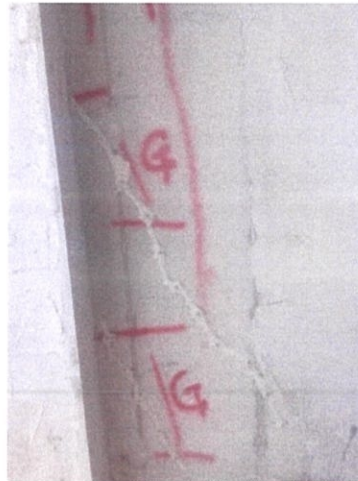


Figure 3.4.2 e) Install packer and sealed.

- III. Start the injection of mixed **sikadur-52 MY** as per manufacturer's recommendation into the crack through the injection port (packer) using a single injection pump.



Figure 3.4.2 f) Sikadur-52 MY

IV. Injection for vertical crack must be started from bottom upward. Once injection resin oozes out of the next injection ports (packer), sealed the first one and the injection process continued from the next one.



Figure 3.4.2 g) Injection work

V. Once the injection process finished, the injection port (packer) will be removed as well as the sealing material between the injection port (packer).



Figure 3.4.2 h) Remove Packer and Seal

### **3.4.3 Loose Material**

#### **Case 3A-Remove Loose Material**

- I. Upon removal of loose material such as formwork, timber, nail, sponge, tie rod and etc, if have any hole or gap available shall be patched back by sika grout 215 to reinstate back to the original dimension of the structures.

### **3.3.4 Uneven Surface/Alignment out**

#### **Case 4A - Surface defect from 25mm to 50mm**

- II. Check the tolerance of structural member if more than 10mm, the affected surface will be roughened around 5mm with electric hackers to ensure good bond between existing concrete and repair mortar
- III. Remove loose material on the hacked surface.
- IV. Patching up using sika grout 215 to the prepared surface.

### **3.3.5 Cement Slurry**

#### **Case 5A – Remove slurry**

- I. Hack or chip or scrap off the hardened slurry on the defective area and ensure good bond between existing concrete and repair mortar if necessary by patch up using sika grout 215 to the prepared surface

#### **4.0 CONCLUSION**

In conclusion, post concrete work is as important as any other work in construction. They will check the quality of the concrete and repair the bad condition concrete. There are many types of defects on concrete that can be found on site.

Material is one of the most important elements in rectification work. If the rectification work uses a wrong material, the rectified area will start to break again in the future.

## REFERENCES

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<https://theconstructor.org/practical-guide/post-concrete-inspection-and-testing/7524/>

<https://www.setiakonbuilders.com.my>

<https://theconstructor.org>



## **APPENDIX**

Example of Method Statement For Repair A Crack Line.

EXECUTION AND COMPLETION OF CADANGAN 1 BLOK PEJABAT 48 TINGKAT YANG MENGANDUNGI:

- I. 1 TINGKAT PODIUM RUANG LOBI, RUANG PERDAGANGAN (ARAS 1) DAN RUANG PEJABAT PENGURUSAN (ARAS MEZZANIN),
- II. 1 TINGKAT RUANG PERDAGANGAN DAN RUANG M&E (ARAS 2),
- III. 8 TINGKAT PODIUM TEMPAT LETAK KERETA (ARAS 3 HINGGA ARAS 10),
- IV. 1 TINGKAT RUANG RESTORAN (ARAS 11),
- V. 3 TINGKAT KELAB PERSENDIRIAN (ARAS 12 HINGGA ARAS 13A),
- VI. 33 TINGKAT RUANG PEJABAT (ARAS 15 HINGGA ARAS 47) DAN
- VII. 1 TINGKAT TEMPAT LETAK KERETA BASEMEN.

DI ATAS LOT - LOT 402, 490, 507, 1215, PT 146 (ASALNYA LOT 1214), PT 149 (ASALNYA LOT 752), PT 150 (ASALNYA LOT 527) DAN PT 200, SEKSYEN 67, JALAN DELIMA, JALAN UTARA DAN JALAN KEMUNING, WILAYAH PERSEKUTUAN KUALA LUMPUR UNTUK TETUAN PEDOMAN CEKAP SDN BHD.

# METHOD STATEMENT

## FOR

### REPAIR CRACK LINES

### AT VERTICAL SURFACE

### OF 200MM RC WALLS

REVISION NO: 02

ACTIVITY	DESIGNATION	NAME	SIGNATURE	DATE
Prepared By:	QAQC Engineer	NUR AIMA FARIHA		
Checked By:	Construction Manager	M. Najib		
Verify By:	Project Manager	GANESH PALANISAMY		

## 1.0 OBJECTIVES

The purpose of this method statement is to describe the type and sequence of repairing materials and methods to be used for repairing of crack defect.

## 2.0 SCOPE OF WORKS

This documents covers the work for the repair of finishing and structural concrete member accordance with the contract specifications and manufactures recommendation.

## 3.0 REFERENCES

The method statement shall be read in conjunction with the followings:

- 3.1 Construction Drawing
- 3.2 Contract Specification (Engineer C&S Specification)
- 3.3 Technical data sheet for approved material.

## 4.0 RESOURCES PLANNINGS

- 4.1 Machinery / Tools / Equipment
  - 4.1.1 Drilling power tool
  - 4.1.2 Plain Water
  - 4.1.3 Mixing stirrer
  - 4.1.4 Technical data sheet for approved material.
    - i) Sikadur-52 MY
    - ii) Sikadur-31 CF Normal
- 4.2 Manpower
  - 4.2.1 Site Supervisor
  - 4.2.2 Client Site Office (RE/COW)
  - 4.2.3 Workers

## 5.0 HANDLING AND STORAGE

- 5.1 Consignments of materials should be placed so that they will normally be used in order of delivery and so as to permit the inspection and sampling of individual's batch.
- 5.2 All materials should be inspected both when delivered to site and immediately before use, to check whether they have been subjected to deterioration or damages.
- 5.3 All material should be handle with care and the workers are equipped with personal protective equipment (PPE). The prepacked material shall be stored on a dry area, off the ground to prevent contact with ground and dampness. Any torn of prepacked bag and/or hardened/expired of material upon arrival at the site shall be rejected and immediately remove from site. Consignments of material should be arranged in a way that it is used in the order of delivery (First In First Out - FIFO).

## 6.0 WORK METHODOLOGY

6.1 Concrete problems found at site can be summarised as per below:

No	Defect	Case	Description	Treatment	Material
1	Crack	1A	Hairline crack surface <b>less</b> <b>0.30mm</b>	Patching	Sikadur-31 CF Normal
		1B	Surface cracks with <b>over</b> <b>0.30mm</b> (for crack with shallow depth)	Pressure Injection	Sikadur-52 MY Sikadur-31 CF Normal

6.2 Identify Join inspection with CSO/RE to identify width of crack which fall under which case before carry out the rectification work as per above tabulation. Use **Sika Ruler** to measure that crack line.

6.3 Rectification work:

### 6.3.1 Epoxy Patching to Crack (Width : < 0.30mm)

- i) Saw cut 'V' shape groove line along the fine cracks
- ii) After completion, flush the hole to remove all dust
- iii) Mix the epoxy resin, Sikadur 31 CF Normal according to manufacturer's specification
- iv) Patch the crack line using Sikadur 31 CF Normal
- v) Allow epoxy gel to set before further finishes are applied to the slab's surface.

### 6.3.2 Epoxy Injection to Crack (Width : > 0.30mm)

- i) All cracks must be cleaned and free from dust, oils, grease, laitance and surface contaminants.
- ii) Drill 10mm dia. injection holes along the crack at the structure.
- iii) The distance of the drilled holes to each other is approx. 150-200mm centre to centre along the crack.
- iv) Apply a layer of superficial seal over the crack line using epoxy gel
- v) Install injection packers in the holes and tighten.
- vi) Pump sikadur 52MY at a pressure approximate 1000 psi into the crack line.
- vii) The injection of the epoxy resin shall begin at the entry packer at the lowest elevation. Injection shall continue at the first packer until the epoxy resin begins to flow out along the crack until the second packer. Shut off the first packer and continue injection at the second packer. The entire crack shall be injected with the same sequence.
- viii) Clean and make good the crack.

Note: All mix and application of SIKADUR-52 MY and SIKADUR-31 CF Normal must be done in accordance to manufacturer's instruction. Please refer **Attachment 3** of product data sheet for this product.

## **7.0 HANDOVER PROTECTION & PRESERVATION OF WORK-IN-PROGRESS (WIP)**

- 7.1 The Contractor shall be responsible to manage and take measures to protect and preserve their work in progress as well as work handed over as per requirements.
- 7.2 Ensure cleaning and housekeeping work should be done and accepted by Client Representative.

## **8.0 INSPECTION AND TEST PLAN**

- 8.1 The Client Representative shall be informed via RFI before proceeding with the work.
- 8.2 The work shall not proceed without approval from Client Representative.
- 8.3 On going inspection during hacking work up to sound concrete must be witness by Client Representative where photo after completion must be recorded in post concrete inspection form.
- 8.4 Contractor shall first inspect the work completed by worker to its satisfactory prior request joint inspection from Client Representative.

## **9.0 HEALTH, SAFETY AND ENVIRONMENT**

- 9.1 Ensure that appropriate PPE such as helmets, safety shoes, vest and other safety equipment is used while entering site.
- 9.2 SBSB will enhance safe working practice on all jobs and create a healthy and safe working environment for all concerned by:
  - 9.2.1 Compliance, implementation and enforcement of the regulations in line with Occupational Safety and Health Act 1994 and Environmental Quality Act 1974.
  - 9.2.2 Safety first for all manpower. Workers to wear basic PPE during carried out the works.